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**ISTANBUL UNIVERSITY**  
WORLD CONFERENCE  
ON TECHNOLOGY, INNOVATION AND ENTREPRENEURSHIP  
“ENTREPRENEURSHIP FOR TECHNOLOGY  
AND INNOVATION - BASED SUSTAINABLE DEVELOPMENT”



Wow Istanbul Convention Center  
May 28 - 30, 2015



**CONFERENCE BOOK**

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## **Dear Academicians, Entrepreneurs and Investors,**

Technological developments and innovation have become one of the most important determinants of international competitive advantage in recent years. Countries which create new technologies and innovative procedures and apply these developments to the production processes can achieve high economic growth rates and converge to the high income countries quite easily. Hence, nowadays technology and innovation play a key role in terms of economic development.

The World Conference on Technology, Innovation and Entrepreneurship organized by Istanbul University and held in Istanbul between 28 and 30 May 2015 aims to create a bridge between university and industry by bringing academics, firms and entrepreneurs together.

This volume of proceedings from the conference contains papers that were presented during the conference. The first section of the book includes the abstracts of the oral presentations. In the following sections, poster presentations and full papers are presented. This book gives an opportunity to the readers to find out the most recent academic research about technology, innovation and entrepreneurship together with the most debatable issues in this field.

The World Conference on Technology, Innovation and Entrepreneurship would not materialize without the significant contributions of a big team. Firstly, I would like to thank the authors who presented their valuable works at the conference. Secondly, I would like to thank Dominique GUELLEC, Head of the Science and Technology Policy Division (STP), OECD Directorate for Science, Technology and Innovation; Prof. Stefan SCHEPERS, Secretary General High Level Group on EU Innovation Policy Management; Prof. Jarko FIDRMUC from Zeppelin University and Stefano FANTI from Bologna University for their great contributions as keynote speakers of the conference. I also would like to thank vice chairpersons, organizing committee, scientific committee and the referees who did a very hard job in order to organize a flawless conference. I am grateful to our sponsors (Ministry of Science, Industry and Technology of the Republic of Turkey, The Republic of Turkey Prime Ministry Investment Support and Promotion Agency, Republic of Turkey Promotion Fund, Istanbul Metropolitan Municipality, Halkbank, KuveytTürk, IGDAS, Albaraka, BELBIM, Hamidiye Spring Water, Istanbul Ağaç ve Peyzaj, Istanbul Halk Ekmek, ISBAK, Istanbul Ulaşım, ISTEK, IZTON, Turkish Airlines, Turkish Technic, Central Bank of the Republic of Turkey, Ziraat Bank, Turkish Academy of Science, The Scientific and Technological Research Council of Turkey, Karaca, Zorluteks, Elsevier, Tvnet, Yeni Şafak) for their valuable supports. Additionally, I would like to thank Ali ÇALIŞKAN, the director-general of the Figür Congress and Organization Company; Bener ATAKAY, the deputy director-general of the Figür Congress and Organization Company and all of the staff of the Figür Congress and Organization Company for their hard work. Finally, I would like to thank our Rector Prof. Mahmut AK and Vice Rector Prof. Sedat MURAT who provided full support at every stage of the conference.

I hope that you will find the program intriguing and the conference will give all of the participants an opportunity to exchange knowledge with other researchers, firms and entrepreneurs from all over the World.

**Prof. Sefer ŞENER**  
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**ORAL PRESENTATIONS**

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OP-001

**A Comparative Assessment of Turkey for its Status and Readiness for Knowledge Society from Human Capital Perspective \***

*Muammer Koc*

*HBKU, Sustainability Division, Education City, Doha, Qatar*

The role of human capital as the basis of economic and social development will be examined through a comprehensive literature survey and critical analysis in conjunction with its interplay with social capital. The objectives of this study are to: (1) examine the knowledge economy and society as a major factor of economic growth, human and social development with recent examples; (2) understand the building blocks of human and social capital, and their impact on knowledge society, sustainable development and public welfare; (3) identify the roles, mechanisms and policy framework for education, science, technology and innovation systems towards the development of human and social capital in the context of Turkey.

Based on the understandings from critical analysis of existing literature in general on human and social capital development, in particular on knowledge society/economy, innovation systems, science & technology policies and education and their historical evolution and current status in Turkey, a policy framework, strategies and implementation roadmap are proposed for the development of advanced, long-term, sustainable and integrated system for education, science, technology and innovation in Turkey to establish a formidable, broad and strong foundation to drive transformation into knowledge-based society/economy, sustainable economic and social development, competitive, prosperous and wealthy Turkey considering its regional, national and societal needs, constraints, culture and history.

OP-002

**Prospective Human Capital: How Materialistic are Thai College Students? An Analysis of Spending Tendencies and Debts \***

*Phaminee Naruetharadhol, Chavis Ketkaew, Pomwadee Kerdpech, Praphasorn Kaoplod, Rattiporn Kannarat*

*Khon Kaen University International College, Department of International Marketing, 123 Mitraph Rd., Khon Kaen, 40002, Thailand*

The research was designed to investigate the relationship of Materialism to college students spending tendencies and debts by using correlation analysis. Materialism has been defined by Richins and Dawson (1992) as “the importance ascribed to the ownership and acquisition of material goods in achieving major life goals or desired states.” (Richins and Dawson, 1992). A materialistic lifestyle seems to be more and more modern especially for college students. 800 Thai college students from Khon Kaen University and Maharakam University currently reside in Northeastern part of Thailand were invited to participate in the questionnaire survey. The correlations of materialism, student’s spending tendency and debt were explored by investigating through students’ perception toward themselves and each aspect that considered having correlations. Age, sex, income and education were considered as variables of being materialism, being in debt and effect of their spending tendencies. The results indicate that the correlations between materialism, spending tendencies and debt are prominently significant. Sex seems to have relationship with being materialism and being in debt. Participants with higher incomes have positive attitude toward debts than participants with lower incomes. Contrarily, age and education appear to have no correlations with any aspects.

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OP-003

**A Research on Job Satisfaction Factors of Private Entrepreneurs: The Case of Beylikduzu Organized Industrial Zone \***

*Aysegül Ertuğrul<sup>1</sup>, Evren Ayrancı<sup>2</sup>*

*<sup>1</sup>Department of Banking and Finance, School of Applied Sciences, Istanbul Arel University, Istanbul, Turkey*

*<sup>2</sup>Department of Business Administration (in English), Faculty of Economics and Administrative Sciences, Istanbul Arel University, Istanbul, Turkey*

There is great evidence that entrepreneurship is not solely a very attention-taking fact in business context, but is also a very prominent subject in terms of scientific research. There are many studies performed to understand the reasons, nature, factors and results of entrepreneurship in both national and international literature, albeit the focus on the businesses in organized industrial zones is not much emphasized in the Turkish literature. An aim of this current study is to contribute to the relevant literature in this sense. Another aim is towards the subject of job satisfaction; there are indeed countless studies considering job satisfaction of the workers and managers in many different contexts in the world. A drawback is that the job satisfaction factors of business owners are generally ignored in the literature, and this gap is intended to be partly filled in by this study. Put together, this study investigates the factors, which encourage or discourage the business owners’ satisfaction with their own businesses in the Turkish context. For the operationalization of this investigation, businesses in Beylikdüzü Organized Industrial Zone, most of which are limited liability companies, are selected and many instruments are combined in order to cover as many job satisfaction affecting factors as the study can. In this process, evidence from Turkish literature is also found and noted with the intention of building upon the current body of research. The results yield that there are multiple factors related to the business owners’ job satisfaction.

OP-004

**Testing the Impact of Unemployment on Self-Employment: Empirical Evidence from OECD Countries \***

*Ferda Halicioğlu<sup>1</sup>, Sema Yolaç<sup>2</sup>*

*<sup>1</sup>Yeditepe University*

*<sup>2</sup>Istanbul University*

The impact of unemployment on self-employment is rather an ambiguous issue since there exist two counter arguments. According to the theory of income choice increased unemployment may lead to increased entrepreneurial activities whereas a counter argument suggests that an increase in unemployment rates may also decrease the endowments of human capital and entrepreneurial talent. The empirical evidence on this issue seems to support both hypotheses. The aim of this research presents fresh and more comprehensive evidence in this issue from 28 OECD countries using the ARDL approach to cointegration over the period 1986-2013. Initial empirical results suggest that the first hypothesis holds in the case of 18 OECD countries whereas the second hypothesis is valid in the case of 10 OECD countries. The empirical results are evaluated for policy recommendations.

OP-005

**Levels of Job Satisfaction Among Engineers in a Malaysian Local Organisation \***

*Rahman Hashim*

*Universiti Teknikal Malaysia Melaka.*

Currently, most of the organisations faced the challenge to maintain their employees’ commitment in their current business environment. Skill employees, like engineers, are willing to change their employer if they get better offer from other organisation. This is often due to low organisational commitment. As such, this study examines the organisational commitment among engineers at Tenaga Nasional Berhad (TNB). The specific objectives of this study is to find out the levels of engineers’ job satisfaction in the specific organisation. Data were collected from 336 engineers from four regions in Peninsula Malaysia, namely North, South, East and West, using stratified random sampling

procedure. These four regions were divided to represent four states which run three TNB's core businesses, which are generation, transmission and distribution. Descriptive and inferential statistics were employed to answer the objectives and to test the hypotheses of the study. One general hypotheses and three sub-hypotheses were developed based on the Social Exchange Theory. All of the hypotheses predicted that organisational commitment are positive related to job satisfaction. The results show that job satisfaction were considered as among the factors that contributed to organisational commitment. It was also found that although the levels of job satisfaction among the engineers were much lower, they still remained in the organisation.

### OP-006

#### **Business World-University Cooperation Interfaces Perception of Faculty Members \***

*Murat Yalçıntaş<sup>1</sup>, Cihan Çiftlikli Kaya<sup>1</sup>, Başar Kaya<sup>2</sup>*

<sup>1</sup>*Istanbul Commerce University, Dept. of Business Admn., Istanbul, Turkey*

<sup>2</sup>*Yıldız Technical University, Technology Transfer Office, Istanbul, Turkey*

Contemporarily, competitive economies are sole economies that can produce new products. New products are fundamentally obtained by the production of knowledge at the universities and the transformation of this knowledge into technologies by means of various interfaces. Within this framework, several interfaces have been developed in Turkey, and incentive systems have been put into practice. The most important link between the interface and incentive infrastructures is the position of the faculty members who play a key role in developing innovative products. There are several factors encouraging faculty members to take an active role, or preventing them from doing so in R&D projects and the development of new technologies. While some interface models facilitate the cooperation between academics and the business world due to their ease of application and financial advantages, other interface models make it difficult due to the red tape and burden of taxes. The purpose of this study is to put forward the factors which encourage and discourage universities in Turkey to develop joint projects with the private sector and to determine how the faculty members perceive these factors. The study explains the historical development of the university-private sector cooperation in Turkey and defines the cooperation interfaces. Thereafter, a questionnaire was prepared based on the literature, and by making use of the qualitative interview method of the in-depth interview technique, the questionnaire has been submitted to the related faculty members. As a result of the responses obtained, the private sector-university cooperation interfaces and their positive/negative aspects as perceived by the faculty members have been evaluated and interpreted. The results of this study, are expected to form an academic basis for further quantitative studies on this subject.

### OP-007

#### **The Effects of Leader's Behavior on Job Satisfaction: A Research on Technology Fast50 Turkey Companies \***

*Buket Akdol, F. Sebnem Arikboga*

*Istanbul University, Faculty Of Economics, Department Of Business Administration*

Advances in technology, intense competition, and changes in the form and function of the organizations in the last decades have elevated the importance of innovation, and the worker's creativity as a survival mechanism for corporations in the marketplace. The personal characteristics of employees, and organizational climate have a significant affect on innovation and worker's creativity. High job satisfaction is a key factor for innovative work environment, and also correlates with positive attitude and high performance at workplace. Researches show that leadership is an important variable that enable high job satisfaction. In this study, we focus on the effect of leader's behavior on job satisfaction. Empowerment, accountability, standing back, humility, authenticity, courage, and forgiveness are used in this study as important dimensions of contemporary leadership theories. Not only overall job satisfaction but also creativity facet of job satisfaction was considered. Survey method was used to collect data from Technology Fast50 Turkey companies. Multidimensional Measure developed by Van Dierendonck, Nuijten (2011), and short form of Minnesota Job Satisfaction Questionnaire (MSQ) developed by Weiss, Davis, et al. (1967) were used as assessment tools in the survey.

\* Indexed by Elsevier

### OP-008

#### **Characteristics and Attitudes of Entrepreneurs Towards Entrepreneurship \***

*Şükriü Gedik, Mehmet Miman, Serdar Kesici*

*Toros University*

Entrepreneurship is a popular concept that is discussed by a variety of disciplines. In this study, a survey is developed to figure out the characteristics of entrepreneurs. Furthermore, how they look at entrepreneurship is investigated according to their demographic factors (gender, age, level of education, faculty from which they graduated, knowledge of a foreign language, financial organization, sector etc.) The survey is to be applied on at least 60 entrepreneurs selected randomly.

### OP-009

#### **Things have Changed: Making and the Future of Entrepreneurship \***

*Eric Joseph Van Holm*

*Georgia State University and Georgia Institute of Technology, Andrew Young School of Policy Studies, Department of Public Management and Policy, Atlanta, Georgia, USA*

Entrepreneurship is essential to the growth and dynamism of countries and regions, forcing policy makers to search for levers to generate new firms within their municipalities. Without public attention, the maker movement, which refers to the democratization of access to and information on using tools, has risen from a fringe lifestyle to a prominent hobby with important implications for public concern. Modernly, tools have been available only to those working within firms and industry or those willing to pay large costs for their procurement. The maker movement presents multiple avenues to increase access to these tools, with the potential for impacts on the quantity and nature of entrepreneurship. My paper explores business and entrepreneurship literature on the critical inputs to small business generation to posit the theoretical reasons that access to tools should foster firm creation. As defined in the paper, the maker movement will influence entrepreneurship through three principle channels. The maker movement lowers the costs for prototyping, making early sales and acquiring outside funding more realistic. Secondly, the maker movement generates dense but diverse networks, creating new ideas and innovative thinking. Lastly, the flexible instructional model practiced by the maker movement crates great opportunity for skill acquisition and marketplace matching. In addition, the ethos of the maker movement can be seen as promoting desire for small batch manufacturing, creating new opportunities for entrepreneurs to succeed in crowded markets. The positive benefits resulting from the maker movements' rise and growth indicate that it is deserving of public support.

### OP-010

#### **Incentives to Promote Entrepreneurship in Greece: Results Based on the 'New Innovative Entrepreneurship' Program \***

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This paper examines a national case of providing incentives, which aims at promoting entrepreneurship and enhancing innovation. This national case concerns the case of Greece and the analysis is based on the participation of the Greek, existing and prospective, entrepreneurs and their project proposals in the 'New innovative entrepreneurship' program, which was launched in 2011. The analysis is based on the examination of a sample of 439 projects-proposals submitted by existing and prospective Greek entrepreneurs. Typically, the program under consideration provided incentives in the form of grants to promote entrepreneurship in Greece and was seen as a main driver for the upgrading of the country's production structure and its redirection towards high added-value goods and services.

The research findings show that half of projects are related to the manufacturing sector. Overall, however, the majority of projects concern the activities of

information technology and its applications, while emerging sectors seem to be those of 'scientific research and development' and 'architectural and engineering activities; technical testing and analysis'. In addition, nearly half of projects concern start-ups and very small and small new firms located in the region of Attica. Results also show that only the 16.9% of projects use the banking system as a complementary financing source. The 27.3% of projects has rights of intellectual property ownership related to the innovation introduced at the level of the Greek territory. The majority of the Greek entrepreneurs intend to introduce a new or significantly improved product or service in the market based on their innovative idea, aiming at diversifying and improving the quality of their products and/or services. Last but not least it seems that the Greek entrepreneurs have as main target the increase of their profitability and the further strengthening of their competitive position in the market.

**OP-011**

**Success Factors of Lebanese SMEs: An Empirical Study \***

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The survival of SMEs during the last economic crisis, despite the hostile environment, pushed many authors to ask why some companies decline while others persist.

Previous studies on finding the determinants of performance were examined rather large enterprises using accounting and financial data. The accounting based measures from the financial statements typically begin with the calculation of a set of financial ratios charged to identify the strengths and weaknesses of a company relative to its competitors operating in the same industry. Research into small and medium sized enterprises (SMEs) has grown during the last decade. A huge majority of firms worldwide are SMEs, and they play a significant role in the economy. Consequently, the performance of the SME sector is closely associated with the performance of the nation. This study attempted to identify factors that are affecting business success of SMEs in Lebanon using the contingency approach. The independent variable is perceived SME performance, by measuring the satisfaction of managers about prior results. This satisfaction was measured by checking two criteria: Financial (the evolution of profitability, turnover and the cash flow) and marketing (evolution of customers' satisfaction). Based on literature review, we examined factors that influence the SMEs business success. These factors are: SMEs characteristic, manager characteristics, and way of doing business (as internal factors affecting the performance). The external factors were divided in two levels. The proximity environment consists of market share, customer, suppliers, competitors, relation with employees and banks. The investment environment is related to the national environment. We tested this model in the Lebanese context. The empirical results show that the manager and SME's characteristics, the proximity environment (without the employees), macroeconomic factors, labor cost and skilled workers availability were statistically significant.

**OP-012**

**The Economic Contribution of Turkish Tourism Entrepreneurship on the Development of Tourism Movements in Islamic Countries \***

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Recently, the sectors constituting the world economy have undergone a structural change because of the increasing degree of causality relationship between the world economy and globalization. In conjunction with this change, the sectors have also entered into an economic growth trend in real terms while structurally changing themselves. As this economic growth trend has pervaded in the world geography, significant raises have been observed in the volume of consumer groups and the markets in which these sectors operate. The pervasiveness come into existence in the world geography has also caused to increase the dynamism of tourism industry. Together with the globalization and increasing incomes, it is clearly understood that the tourism movements have not only an economic dimension but they also cover other factors such

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as particularly social, cultural, religious, political, sportive, environmental and etc dimensions. In our study, we will be trying to figure out whether Islamic Countries take a sufficient share from this economic growth trend and structural change process of the world tourism sector, as well as questioning how to increase the amount of this share through the leadership of Turkish tourism entrepreneurship.

**OP-013**

**A Framework for a Successful Research Products Commercialisation Among Academic Researchers in Malaysia \***

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Research products commercialisation is one of the key agenda of the government to boost the economic growth in Malaysia. This has resulted universities and research institutes to consider commercialising research products as one of their critical activities for income generation. Although much emphasises and encouragement have been put forward to accelerate research products commercialisation activities, commercialisation of research products among academics in Malaysia is less progressing and encouraging. Thus, this paper aims to examine framework for a successful research products commercialisation among academic researchers in Malaysia. For the purpose of the study, interviews were conducted with four academic researchers who have successfully commercialised their research products. Drawn from their experiences and insights, the study found that there are eight elements that contribute for a sustainable research products commercialisation. These elements are knowledge, skills and personal traits of the researcher, idea generation and creation of the product, development and promotion of the product, paths of commercialisation, product competition within the market and industry, business partner, healthy relationship and facilities and supports. These elements are interrelated and interdependent with each other to achieve a sustainable research product commercialisation. These elements are useful for researchers and their industry partners to develop an effective strategy for a successful research products commercialisation.

**OP-014**

**A Fact or an Illusion: Social Media Usage of Female Entrepreneurs \***

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Due to the technological innovations, change in conditions of competition has necessitated new structurings at every stage of life. Today institutional competition is not only shaped around information, ability and experience but also around concepts such as reconciliation, convention, solidarity, recognition, corporation and improvement. At this stage, social media plays a crucial role as altering internet usage behaviors and marketing practices. Many organizations such as GSM operators, banks, airway companies, universities enlarge their promotional activities on social media. In general, large scaled companies carry out their social media campaigns parallel to their communication practices on traditional media. Besides small sized entrepreneurs exposed to several limitations in traditional media may act in a much freer environment in social media. Thus, the ongoing discourse on new communication technologies suggests these new technologies provide a more democratic and equal society. In this sense, this research aims to understand whether social media, as frequently stated, provides an opportunity for small sized entrepreneurs who cannot act on traditional media or it stands as an illusion hiding the inequalities caused by globalization and inevitably by information technologies. For the purposes of this study, the concept of social media will be limited only to the most popular social network site, Facebook. In this research it is found most appropriate to apply semi-structured interviews, a qualitative approach since it deals with entrepreneurs own feelings and perceptions about their use of social

media. Besides, the sample consists of only 12 self-employed female entrepreneurs. In contrast to the existing literature on large-scale social media campaigns the originality of this research lies on focusing on very small entrepreneurs owned/ruled by women and their use of social media.

**OP-015**

**Strengthen Brand Association Through Se: Institutional Theory Revisited \***

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Brand association includes connecting images and symbols with a specific brand or its benefits. Brand marketers attempt to initiate new strategies to strengthen brand association in order to respond effectively to the ever-changing business environment. In today's business context, it has been claimed that business philosophy has shifted from being predominantly orientated towards long-term growth and shareholder profit to broader goals based on the triple bottom line of economic, social and environmental protection and enhancement. Consequently, organizations seeking to survive in this dynamic environment should include social benefits in their business operations. By drawing upon institutional theory and examining the key dimensions of brand equity, we show that business social enterprise is not just emerging but becoming a normative pressure on organizations. Thus, we propose that organizations conforming to this new form of business model as a so-called social enterprise (SE) can strengthen their brand association, leading to further gains in legitimacy in the field. We derived two formal hypotheses from this conceptual framework for testing through the use of a questionnaire. The questionnaire was developed and used with employees working in management levels from various types of social enterprise businesses in Thailand. Statistical analyses were applied to test the hypotheses. Results support the relationship between social enterprise businesses and increases in brand association from the institutional theory perspective as proposed. We hope that this research paper contributes to the branding as well as social enterprise literature by providing a comprehensive framework and discussing relevant issues in explaining key variables. We conclude the paper with specified implications for future research and management practice.

**OP-016**

**Patentability Under Turkish Patent Law According to the Decree Law No. 551 on the Protection of Patent Rights \***

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The Decree Law numbered 551 and dated June 24 1995 on the Protection of Patent Rights (the Decree-Law) aims at protecting the inventions by granting patents. Not all inventions but some which have specific qualifications are patentable. Although the term "invention" is not defined by the Decree-Law, the patentability requirements are prescribed by the Decree-Law between the articles 5 and 10. According to the Decree-Law, inventions which are novel, applicable in the industry and within the scope of patentable inventions are patentable. Novelty refers being new and surpassing the State of Art. Being applicable in the industry refers that an invention is produced or used in any field of the industry including agriculture. These are the positive requirements of patentability. Both requirements are essential but not enough for an invention granting a patent protection. The last and the negative requirement of patentability is that inventions as of their natures, should remain outside the scope of non-patentable inventions which are listed in the Art. 6 of the Decree-Law. All requirements are obliged to be met for an invention to be granted a patent protection. However, since the number of patent applications are really low in Turkey, all the competent authorities must make reformatory alterations and take some innovative and incentive measures in this regard, including amending a new Patent Code instead of regulating these issues with a Decree-Law, even though the provisions of this Decree-Law regarding patentability are in conformity with the international legislation and international tendencies.

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**OP-017**

**Entrepreneurial Brand \***

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In today's environment of fierce competition, enterprises must have an entrepreneurial frame of mind to be able to sustain their presence and have a competitive advantage in the markets. An entrepreneurial approach, as such, would ensure detection of the changes taking place in the market before competitors and the benefit derived from this would be made available to consumers. On this basis, it can be said that the entrepreneurial approach involves taking risks by being focused on competition and at the same time aspiring to a leading position in the markets by fostering a customer oriented perspective. In this type of understanding, adaptation of an innovative perspective is essentially important in achieving success.

In an entrepreneur organizational structure, one of the important factors in achieving success is to be able to establish a strong brand. However, the establishment of a strong brand would only be possible if the concerned brand is in possession of creative values. Within this context, it is essential to demonstrate the clear and distinguishing features of the benefit offered in consideration of customer satisfaction, ensuring that these features are sustained while the creativity is being cultivated in the face of the corroding effects of time and the creative destruction that technological advancements cause. At this point, the concept of "Entrepreneurial Brand" makes its presence known as it continues to gain importance. In this study, primarily the importance of creativity and innovativeness in entrepreneurship and brand formation will be emphasized. Then, the long term contributions that an entrepreneurial brand can make to achieving competitive advantage in the markets will be elaborated. Finally, within this context, the strategies that could lead to success will also be stated.

**OP-018**

**Attributes for Image Content That Attract Consumers' Attention to Advertisements \***

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Advertisement is an essential tool in promoting products and services to customers. Image is one of the components in an advertisement, which gives a clearer picture of what is being promoted. Accordingly, image was identified as one of the factors that can attract consumers' attention to advertisement displayed in a media. In connection to the previous study, the factors regarding on the advertisement avoidance has been determined. As for that, this study will be looking at image content that attract consumers' attention to an advertisement. Factors analysis was used as the methodology in gathering and analyzing all the factors studied. This study will contribute to the knowledge in marketing strategy and gives guidance to designers in designing an effective and attracting advertisement. In addition to that, this study will also discuss in detail on all the factors that contribute to the media attention.

**OP-019**

**Operational Improvements in the Assembly Process of Lead Cable by Using New Methods \***

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Since the beginning of the 18th century, ergonomics and work studies have been used in the manufacturing industry. Because of the developments in mechanization, the work force has been significantly reduced. To efficiently use the resources of manufacturing systems, ergonomics and work studies are important and effective methods. Therefore, manufacturing firms are advantageous for evaluating different opportunities related to ergonomics. In this study, an ergonomical study was conducted to improve the flow of

processes for assembly in a cable manufacturing company. Then, newly improved processes and machine systems were proposed. Unnecessary work was eliminated, and a significant gain in time was obtained.

**OP-020**

**STARMA Models Estimation with Kalman Filter: The Case of Regional Bank Deposits \***

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In this paper, the performance of the STARMA models and its advantages for the time and space dependent variables are analyzed. The beginning of the STARMA models starts in 1980's. But it was kept in the background, because of both inadequate data sets to review and estimation difficulties. When we take a look at the literature, it can be seen that, by using linear and non-linear estimators it is possible to estimate STARMA models. It was observed that non-linear estimators are more efficient with data frames. That is why the Kalman Filter and Maximum likelihood estimator was used in this paper. The calculation of spatial weight matrix is done with software "Kure" which is developing by our team. As a case study we tried to review the regional deposits of commercial banks in Turkey. Statistically significant and robust conclusions revealed that STARMA model has a high estimation performance.

**OP-021**

**Numerical Study of the Dispersion Properties of an X-band Backward Wave Oscillator with Rectangularly Rippled Wall Resonator \***

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Backward Wave Oscillators (BWOs) are devices that transform the electron beam energy into electromagnetic radiation at microwave frequencies. O-type BWOs consist of an axial electron beam propagating through a resonant cavity comprising of a slow wave structure (SWS). The electron beam is guided by a strong magnetic field while propagating through the cavity. The SWSs are used in BWOs in order to slow down the phase velocity of the electromagnetic wave so that the electron beam can resonantly interact with the wave which is the prerequisite of microwave generation. Dielectric loaded periodic structures were used as SWSs during the early stage of development of BWOs. However, this method of slowing down the wave suffers from dielectric breakdown as it cannot support high electric field. In order to prevent the dielectric breakdown, periodically corrugated metallic hollow waveguides are now being used as SWSs in BWOs. The sinusoidally corrugated SWS (SCSWS) has received the greatest attention among different corrugation profile. However, the fabrication process of this profile is complex and requires sophisticated tools. In this paper, we propose a rectangularly corrugated SWS (RCSWS) in an attempt to mitigate the fabrication problem. Rectangular profile can be constructed easily using the sections of metallic cylinders with different inner radii. The dispersion properties of the axisymmetric transverse magnetic (TM) modes of the proposed structure have been analyzed numerically. Fourier series has been used to approximate the axial profile of the SWS and the linear Rayleigh-Fourier theory has been utilized to determine the cold structure dispersion properties numerically which can be characterized by real frequency and wavenumber. The proposed SWS would provide ease of fabrication and can be implemented in real experiments involving BWO for high power microwave generation.

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**OP-022**

**Dimension Optimization of Microstrip Patch Antenna in X/Ku Band via Artificial Neural Network \***

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This paper is aimed at designing the effective shape of a microstrip patch antenna for X Band (8 to 12 GHz) and Ku Band (12 GHz to 18 GHz). Artificial Neural network is used for optimizing microstrip antenna dimensions. The network takes the different microstrip antenna parameters as inputs and delivers its dimensions in the X/Ku Band satellite communication. The error and validity analysis of neural network results are occurred in Matlab. Finally, HFSS simulation program results for prototype microstrip antenna, which has the best antenna parameters, is compared with each others.

**OP-023**

**High Efficiency Single Phase Switched Capacitor AC to DC Step Down Converter \***

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A new topology of single-phase AC-DC converter using Buck-Boost conversion with high efficiency at extremely low duty cycle is proposed. Proposed double stage converter consists of single phase rectifier followed by a switched capacitor buck-boost DC-DC converter. The input current THD is kept low and the input power factor is kept high with two-loop feedback control. The proposed schemes can be used for new generation LED lighting.

**OP-024**

**A Novel Control Scheme for Buck-Boost DC to AC Converter for Variable Frequency Applications \***

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This paper represents a novel control scheme for buck-boost DC to AC converter in variable frequency operation. Voltage controlled dual slope delta modulator is designed to reduce the harmonic distortion of the output voltage for variable frequency applications. The output of the buck-boost converter with the proposed control scheme produces near sinusoidal voltage of constant magnitude irrespective of the frequency. The total harmonic distortion of the proposed scheme is under 4% which within IEEE Std 519 Voltage Harmonic Limits.

**OP-025**

**Entrepreneurship Education at Universities: Suggestion for a Model Using Financial Support \***

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The public sector is not the only one that creates more, better jobs in developed countries. In addition, the private sector seems to have a major role in solving the problem of unemployment. This poses a question: which type of companies can provide employment to the individuals seeking employment? Lately, it seems that only companies which use advanced technology and startup companies can provide new jobs to those seeking employment. Currently, the mission of the university as an institution has changed. Education of entrepreneurship is the one of the important areas of study in universities all around the world. Developments on information and technology have reached a high level, creating new challenges and problems



for universities. It is possible for universities to revise their missions and visions. This mission should include objectives of education and a suitable strategy that considers the private sector and its expectations from universities. Collaboration with industry and other related sectors can support universities, and encourage them to add courses like "Entrepreneurship" to their curricula. In addition, this encourages universities looking for new partnerships. One such partnership is called KOSGEB (in Turkish), which is a state owned "Small and Medium Enterprises Development Organization". KOSGEB can provide fiscal aid, some refundable and some not, to all small and medium enterprises. KOSGEB also provide huge opportunities to potential entrepreneurs who want to establish a new business through its Entrepreneur Support Programme. One component of the program is to provide monetary support up to 100.000 TRL in total. In this study, we will discuss the Entrepreneur Support Programme of KOSGEB, and whether it is feasible for solving the problem of unemployment after university education. We ask if this programme is a good collaboration to help students, and how universities can apply this support programme to their academic programme.

**OP-026**

**Conceptual Development of Academic Entrepreneurial Intentions Scale \***

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Academic entrepreneurship is recognized as one of the values created by universities with their mission of being an entrepreneurial university in addition to teaching and research. The "entrepreneurial university" concept carries out this mission with technology transfer and firm formation activities. "Academic entrepreneur" can be defined as a faculty or advanced level research student at a university who creates a new organization and bring his or her innovation/invention/solution to market as a commercial opportunity. Based on the Theory of Planned Behavior by Ajzen (1991) and Armitage& Connor (2001), the best predictor of this behavioral outcome of being involved in setting up an academic spin-off can be referred to as "academic entrepreneurial intentions". There are various scales in place attempting to measure entrepreneurial intentions of adults and students such as Chen's Entrepreneurial Decision Scale (1998), Kruger's Entrepreneurial Intentions Scale (2000), Thompson's Individual Entrepreneurial Intent Scale (2009), and Linan and Chen's Entrepreneurship Intentions Questionnaire (2009). However a more comprehensive scale needs to be developed to measure the target construct of entrepreneurial intentions of academics concerning the individual and contextual circumstances specific to the university settings and the nature of business. In this regard, similar attempts have taken place to develop a scale for measuring academics' entrepreneurial intentions such as the study of Prodan and Drnovsek (2010) however the scale did not provide the specific dimensions to target academics. This research aims to offer a conceptual discussion of measuring academic entrepreneurial intentions promising a novel contribution to construct reliability and validity measures in the future as addressed by Clark& Watson (1995).

**OP-027**

**A New Approach in Preschool Education: Social Entrepreneurship Education \***

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The preschool years is a critical period for children because of the fact that their speed of learning and development is at the highest level in this period. If the education, which is offered during this period, has the qualities to support children's social-emotional, cognitive, physical, and linguistic development, it has great importance for children in terms of living their development positively. In order to support qualities of preschool education and enhance its positive effects on children's development, it is quite important to integrate new educational approaches into preschool education. Social entrepreneurship education is one of these approaches recently emergent. Through providing social entrepreneurship education, it is possible to develop children's abilities and enable them to produce innovative solutions to social problems. In order

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to achieve this, children needs to meet social entrepreneurship education in their developmental period. Social entrepreneurship education, which is taken during preschool period, has many positive effects on children in terms of individualistic aspect. Social entrepreneurship education gives children a chance to experiment what is taught in the school through living in daily life, and in this way, it makes education lifelong by supporting all developmental areas of children. In addition to that, social entrepreneurship education supports children's self-sufficiency, creativity, empathy, rational thinking, and entrepreneurship skills. Moreover, because it is given in a critical period, it has important place in children's life and has an impact on children's academic and social success through both preschool and higher education. In this context, the aim of the study is to reveal the need of school entrepreneurship education, and in parallel with this, to identify individual benefits of social entrepreneurship education which can be applied in preschool education institutions in where children meet with education for the first time.

**OP-028**

**Exploring Business Student Perception of Information and Technology \***

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The purpose of this research is to explore information and technology perception of business major freshman and sophomore undergraduate students at an AACSB accredited business school. AACSB accredited academic programs emphasize the importance of information and technology skills by setting learning goals and offering courses to achieve these learning goals. While learning goals are known and already set, initial information and technology skills, knowledge and perception of students are not well known. Growing up with technology and instant communication, new generations may be developing a different understanding of information and technology issues than the previous generations. Understanding freshman and sophomore student perception of information and technology as a starting point is essential for an effective course and curriculum design to meet the learning goals of accredited business schools. A qualitative approach was adopted in this study to capture and discover the meaning of information and technology for students. 53 students were asked to express their taught about nineteen facts on information, technology, and global forces. The data was collected through a questionnaire. Students commented on facts by answering three generic questions to discuss individual and organizational impacts of these facts, and personal solutions for these trends. A total of 2,938 comments were analyzed to understand student perception of information and technology.

**OP-029**

**Identification of Factors Affecting Organizational Entrepreneurship in Selected Sama Technical Schools \***

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Today, those organizations are able to survive which are dynamic and able to show appropriate response at any time and against any changes, versatility and flexibility. To accomplish this, giving appropriate attention to organizational entrepreneurship is necessary. Researchers such as Jeningr and Borgman, define organizational entrepreneurship as entrepreneurial activity that emerge For the implementation of creative activity in the form of product, process and organizational innovation. Present study, conducted for a selection of technical schools control by Sama Organization of Islamic Azad University which at least produce a product required by other schools. thus identification of factors affecting entrepreneurship from faculty members and staff point of view make other schools to be entrepreneur By modifying the structure, processes and procedures. according to results of the present study which was done based on the ramification model and Using the Pearson coefficient was observed, in The selected schools of Sama there is a direct correlation between Behavioral, structural and environmental factors and entrepreneurship. In other words, By increasing the utility of these parameters, organizational entrepreneurship increases. In order to prioritize the components of each of the three factors

an weighting these factors the Friedman test was applied. finally reached the arrangement of the structural, behavioral and environmental factors.

### OP-030

#### **Evaluation of a Pay for Performance Scheme in Maternity Care: The Commissioning Quality and Innovation Payment Framework in England \***

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Pay for performance schemes (P4P) have been considered by many governments and implemented (for example in the UK and the US) for many years. The English health care system is an example of this: it has recently experienced a wide range of policy interventions which pay providers of health care for quality with the aim of improving the quality of care delivered to the population. Commissioning Quality and Innovation Payment Framework started in 2009/10 with the aim to improve quality of care provided by NHS Trusts. This study examines the impact of the introduction of the Commissioning Quality and Innovation Payment framework (CQUIN) on elective and emergency c-section rates in England. I use 2010/11 taxonomy to investigate whether there is any association between the reduction in c-sections and the 2010/11 CQUIN scheme. The identification strategy is based on the differences in the adoption of CQUIN topics and indicators across trusts as this provides naturally occurring control and treatment groups. I show that the CQUIN scheme does not have any statistically significant impact on c-section rates. However, there is some evidence of an indication for concerns over high rates leading trusts (or the purchasers or SHAs) to want to include maternity as a topic, but that if c-section rates are low, the purchaser is not interested in paying for improvements in performance.

### OP-031

#### **Analysis of The World's Most Innovative Companies on the Basis of Industry: 2005-2014 \***

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In most industries, almost everywhere in the world, growth is harder and harder for companies to generate. Therefore, searching for new sources of growth, companies across all industries and regions are increasing their spending on innovation every year. As a result, innovation continues to be a top corporate priority for the many companies. However, some of organizations' innovation skills are not enough. Because, innovation is hard. Companies demonstrate their abilities to generate new products, markets and revenue streams. Executives may be underestimating the risks they face in the foreseeable future. They need to be prepare themselves for the future. Changing of business manner effects many industry. For example, companies are proving slower to adopt digital. In digital world, big data and mobile are more important than in previous years. They have a significant impact on innovation in all industries. But many companies are not getting the message. This paper to aims to emphasize importance of innovation for companies and to analyze the most innovative companies on basic of the industry between 2005 and 2014. The contribution of this paper consists in analyzing the world's 50 most innovative companies by listed Boston Consulting group (BCG) in terms of range and sectoral distribution. The other aim of this paper is to determine to which companies come from which countries and region in terms of companies listed. Our sample consist in 50 companies listed on BCG for ever year. The results reflect that companies specializing in digital technologies hold the top places or top ten in recent years. The other companies from different sector compare in itself between 2005 and 2014.

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### OP-032

#### **An Empirical Study Regarding Entrepreneurship in Europe and Central Asia \***

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In this article, the effect of total number of days required to register a firm, cost of required to complete each procedure, corporate tax rate, GDP per capita, and voice and accountability on entrepreneurship is analysed empirically in Europe and Central Asia countries. Turkey's current situation is compared with the other countries in the same region. World Bank data are used for region classification. This paper uses a panel data in 16 countries for the period from 2004 to 2012. Entrepreneurship is measured by the variable entry density which is calculated as the number of newly registered limited liability firms per 1000 working age population. The informal sector is excluded due to the fact that it is difficult to determine the number of firms in this sector. Descriptive statistics shows that entry density ranges from 0.2 to 12.2. Sample average of entry density is 2.6 for 16 countries. Georgia, Hungary, Latvia, Macedonia, Romania and Russian Federation have entry density above the sample average. Albania, Armenia, Belarus, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkey, Ukraine and Uzbekistan have entry density below the sample average. Lithuania has 2.57 average entry density which approximately equal the sample average. The panel data analysis concludes that number of days, cost of procedures, and corporate tax rate have negative effects on entry density. There are positive relationship between GDP per capita and entry density. The factor of voice and accountability which is one of measure of governance indicators has a significant positive effect on entry density.

### OP-033

#### **Factors for Increasing the Competitiveness of Small and Medium Enterprises (SMES) in Bulgaria \***

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The competition is the trigger force of any market economies. In the contemporary conditions, competition is determinative for the business development, while competitiveness is the most important condition for overall business prosperity. The area of small and medium enterprises (SMEs), having extraordinary potential for flexible adaptation to the economic circumstances in the country and changing market conjuncture – is of major significance for the national economy development. The incorporation of Bulgaria in the EU provides great opportunities for SMEs support and development. On the basis of the above – mentioned, we can conclude that the purpose of this article is to define and analyze the key factors for SMEs competitiveness increase and outline the direction of their sustainable development in the new economic reality.

### OP-034

#### **Economic and Social Benefits that can be Obtained by a Combination of Innovation and Corporate Entrepreneurship Activities in Turkish companies \***

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*<sup>1</sup>Brisa Bridgestone Sabancı, İstanbul*

*<sup>2</sup>Istanbul University, İstanbul*

The term “innovation” is known by some companies, but the term “corporate entrepreneurship (intrapreneurship)” is very new for developing countries. But in Turkey, quite a few firms not only know these terms but are actually implementing them. There is a huge impact of cultural and educational differences on firms and also on employees in Turkey, compared to developed countries. For this reason, employees are driven away from the desire to be creative. They think this is the way to get promoted. And in fact, companies promote their employees who have this innovation-killing attitude, unaware

of its potential for bankrupting them. However, some companies offer their employees the opportunity to break this trend. They give them opportunities to make innovations and corporate entrepreneurship projects. The aim of this study is to provide an in-depth investigation and comparison between Turkish and global companies in terms of the effects of innovation and corporate entrepreneurship on growth and profitability. Moreover, it will give important insights about well-known innovation methodologies for Turkish companies by using Brisa Bridgestone Sabancı as an example.

**OP-035**

**Determinant Factors of E-commerce Adoption by SMEs in Developing Countries: Evidence from Indonesia \***

*Rita Rahayu*

*The Business School, University of Huddersfield*

The aim of this study is to investigate factors that influence SMEs in developing countries in adopting of e-commerce. This study is motivated by the fact that the adoption of e-commerce by SMEs, especially in developing countries, is still very far behind from the adoption by large companies. Yet to be able to survive in the new economic era, which is information era; businesses, including the SMEs, are forced to adopt it. For those who are not adopted it will be left behind by those who are adopting it. In addition, studies regarding e-commerce adoption by SMEs are rarely found. Therefore, the results of this study are expected can provide an understanding of e-commerce adoption by SMEs in developing countries. The model developed in this study is based on TOE framework. Eleven variables, which are grouped into four groups; technological factors, organizational factors, environmental factors and individual factors, are proposed as the factors that influence SMEs in adopting of e-commerce. Based on a survey of 301 SMEs in Indonesia, it was found that perceived benefits, technology readiness, owners' innovativeness, owners' IT ability and owners' IT experience as determinant factors that influence SMEs in Indonesia in adopting of e-commerce.

**OP-036**

**Creativity Process in Innovation Oriented Entrepreneurship: The Case of Vakko \***

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Today the significance of designing, producing and implementing of a project is increasing day by day both in industry and in universities. However, entrepreneurship is also attracting more attention than ever as a rapidly growing and constantly changing discipline. Thus, it is necessary to develop the ability to design and manage innovative projects and having the entrepreneurial mind for continuous improvement. Creativity and innovation has an important role on the entrepreneurial success. Generally entrepreneurs who succeed, are opposed to existing ideas, norms, values and business practices and develop high-value new products. In this context, the objective of this study is to investigate the cases of successful entrepreneurship by considering innovations that are submitted and creative processes they have had.

**OP-037**

**Connections Between Leadership Features and Attitudes Towards Innovativeness: A Research on Small and Medium-Sized Business Owners \***

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The issue of leadership, with its roots from ancient times, is perhaps one of the most popular subjects in scientific terms as well as in daily life. Accordingly, this popularity has led to the creation of many leadership paradigms and types. A contemporary approach points out that innovativeness is one of the key

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elements in the modern business world and is also connected with leadership. This mentioned connection, however, has somehow a vague point: literature reveals two related claims. While some scholars contend that innovativeness should be a component of nearly all leadership types; some emphasize that a distinct type of leadership, innovation leadership, should primarily be taken into consideration. In this sense, this study aims to shed light upon leadership-innovativeness connection in the Turkish context by focusing on the entrepreneur – the business owner oneself. In accordance with this aim, data from small and medium-sized business owners in İstanbul Tuzla Organized Industrial Zone are collected and evaluated. A general result achieved is that business owners are keen on innovativeness and their perceptions of their own leadership features have partial connections with their innovativeness inclination.

**OP-038**

**Comparing Turkish Universities Entrepreneurship and Innovativeness Index's Rankings with Sentiment Analysis Results on Social Media Messages \***

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In this article we have compared the rankings of Turkish Universities obtained by TÜBİTAK's Entrepreneurship and innovativeness index with rankings obtained by Sentiment Analysis(SA) of the related university's students or graduate student's social media messages.

SA is a method for automatically mining the attitude of the author (or more generally the source) about a thought, behaviour, service or product. For this case we have conducted SA in the context of Entrepreneurship and Innovativeness. Basic question for this is "Is this tweet is relevant or irrelevant for Entrepreneurship and Innovativeness context?" First problem for obtaining ranking by SA is identifying the related university's student's account on twitter. In this phase we have conducted search on bio / profile pages with the related university as a keyword and form a database for account names.

Second problem that we have faced with is doing a SA and obtaining Entrepreneurship and Innovativeness ratings and rankings for all interested universities. For this we have used 13.007 tweets that contains "Entrepreneur" keyword and 14.579 tweets that contains "Innovation" keyword to generate lexicons for SA. In this generation phase we have used Support Vector Machines, Naive Bayes Classifier and C 4.5 data mining algorithms.

After this phase we have perform SA on the approximately 500.000 tweets of 8.000 social media accounts of 50 universities of interested and we obtain a new ranking of these.

Finally we have conducted statistical tests for compatibility of these two university rankings.

**OP-039**

**Applicability to Green Entrepreneurship in Turkey: A Situation Analysis \***

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"Nature" is one of the factors for production. More production causes more consumption of natural resources. In the developing global economy nature are being destroyed due to more profit and rapid industrialization. Due to destruction of nature leads to climate change. Green entrepreneurship offers new opportunities for groups in society and business affected by this destruction. Considering the analysis and the results of different studies, approximately 15% of the research&development and entrepreneurial activities in the in recent years in Turkey seems to be associated with the environment. Parallel increas consists of environmental and entrepreneurial activity in terms of entrepreneurship and research&development. This situation is recognized as an opportunity to improve the green entrepreneurial ecosystem. In the entrepreneurial ecosystem in Turkey, it is known that, in addition to creating a variety of organizations and networks, works of different non-governmental organizations and structural funder providing support for entrepreneurs. According to the legislation

for entrepreneurial activities there are incentives such as tax breaks and tax exemptions. Support of regional development agencies is also important for entrepreneurship. This supports can be opportunity for green businesses and local entrepreneurs. However green entrepreneurship could not be brought to desired level in country because of causes such as created enough information about green entrepreneurship, reached the desire levels of regulation. Both green economy and sustainability could desire to live at same time. The main objective of this study is to determine the advantages and disadvantages encountered in our country about green entrepreneurship. Also how the disadvantages that pointed in the study can be converted into advantages, will be evaluated.

## OP-040

### The R&D and Innovation Capacity of SMEs' in IMES \*

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Small industrial estates and industrial zones are an important contribution to economic and social development. Small industrial estates combined with various industrial policies, such as the clustering of SMEs are very important for the global economy. Clustering approach reduces transaction costs and increases productivity between firms by being together. The firms which are producing complementary and byproducts for each other together and within a program is an efficient way to be competitive and profitable. The studies related with the small industrial estates suggest that the relationship established between these business network is providing a basis for R & D and innovation. IMES Industrial Estate meets a significant portion of industrial machinery and spare parts of medium and large scaled industries with 150 Social Facility, 1150 workplace operating in 50 different areas and more than 12 thousand employees in Turkey. With this research, we want to analyze the SMEs' research and development (R & D) and innovation capacity in IMES Industrial Estate and we will recommend some ways to improve the R & D and innovation capacity. As of April 2013, the SMEs' located in IMES' were included in the study. The survey was administered to 713 out of 851 firms. 580 firms has responded to survey. As a result of this research, R & D and innovation capacity of SMEs in IMES are found to be low. According to this current situation identified with this research, we will make some suggestions to improve R& D and innovation capacity in IMES.

## OP-041

### The Effect of Personality Traits on Social Entrepreneurship Intentions: A Field Research \*

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Research conducted on personality, entrepreneurship and the intentions of individuals towards entrepreneurship has been a widely debated topic recently, both within academia and among business circles. The purpose of this study is to examine social entrepreneurship and personality within a theoretical context and to implement a field study about the subject. In the field study; we have tried to reach students of Business Administration in Istanbul that are taking applied entrepreneurship classes in order to assess students' personality traits and of those students that show intention towards social entrepreneurship by studying the relationships between personal characteristics and their intention towards social entrepreneurship. By examining the obtained information from personal characteristics and which aspects of social entrepreneurship they influence; we have tried to identify, students that have certain personal characteristics that are more inclined to be candidates for social entrepreneurship which personal characteristics should be encouraged among students that are candidates of social entrepreneurship in order for them to establish successful social enterprises and to generate suggestions on which aspects of social entrepreneurship these candidate students must focus on.

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## OP-042

### The Effects of Foreign Direct Investment on R&D and Innovations: Panel Data Analysis for Developing Countries \*

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In today's globalized market, the wealth of natural resources or factor endowments are no longer key factors determining competitiveness. Now the ability to produce different and more high-tech products, obtained by R&D and innovation, provided by Foreign Direct Investments (FDI), has become more important. Due to dynamic structure of international competition, it is inevitable to develop new technologies and products for the countries who want to increase level of competitiveness within both domestic and global market.

FDI, providing substantial financial capital, technological know-how and managerial expertise to the recipient economies play a crucial role. Therefore, multinational companies, intend to have a piece of the pie in the international market, constantly obliged to produce products with new and better technology. Recently it is a fact that FDI is one of the most important factors behind high economic growth achieved, in South Korea, China, India, Malaysia and Singapore. These countries are primarily provided tax incentives, monopoly rights and cost advantages facilities to foreign investors. After they internalized the knowledge and technology by means of producing high-tech and high value-added products, they have managed to export. This paper has attempted to investigate the effects of FDI on R&D and innovation using the panel causality and cointegration methods in 10 developing countries (China, South Korea, India, Iran, Pakistan, Malaysia, Singapore, Thailand, Saudi Arabia and Turkey) in Asia for the 1996-2014 period. It is expected that FDI inflows would increase countries' R&D and innovation activities. The study, once more, will be tried to draw attention to the need of FDI for countries who want to increase level of R&D and innovation.

## OP-043

### Determinants of R&D Investment Decision in Turkey \*

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In this study, we investigate the determinants of research and development (R&D) decision in Turkey in 2008 and 2013. For this purpose, World Bank Enterprise Survey data sets are used. This study is the first attempt to investigate the determinants of R&D decision in Turkey by firm level micro-data. In the study, Generalized Linear Mixed Model for Complex Survey Design approach is used since this approach provides advantages of multilevel analysis and survey design. Estimation findings demonstrate us that sales, subsidy, share of foreign ownership, competition incentive, scale of enterprise, domestic and foreign trade shares are very important factors to influence probability of investment on R&D. Public policies which take into account these factors will be invaluable for growth and development of Turkish Economy.

## OP-044

### Innovation and Crisis: An Analysis of its Impact on Greek Patenting Activity \*

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Creative destruction may be painful, but is also useful, as it fosters innovation and progress by discarding the old and familiar for the new and better. In this perspective, economic and financial crisis could be a source of opportunities for both innovators and innovation systems. From the private sector point of view, the crisis has had different types of effects. These can affect innovation

performance and investments and based on them the implications for innovation can both be positive and negative. Obviously, the crisis greatly affected Greece and examples of its effects include entrepreneurship, firm creation, venture capital financing and innovation. In this context the paper that follows examines the impact of economic and financial crises on the Greek innovation activity, considering patents as proxies of innovation. The paper is structured as follows: The first part discusses the existing literature on this field, namely the concept of economic and financial crisis and its features and the role of innovation in the crisis environment. The second part deals with patent statistics and its use in economic analysis. The third part describes the main points of methodology. Quantitative methodology based on statistical data analysis has been chosen for this study. The choice of methodology was motivated by data availability from a variety of reliable sources, as well as availability of comprehensive statistical and time series analysis that allow assessment of interdependence, and, even, causality between economic conditions and patenting activity. The fourth part of the paper presents the main econometric results, which are based on time series, regression and test for Granger causality between economic and patenting data. Last but not least, the fifth part further discusses the relationship between economic and patenting data, referring to the limitations of the study and also indicating possible future research in this field.

OP-045

**Innovation and the Effect of Research and Development (R&D) Expenditure on Growth in Some Developing and Developed Countries \***

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The concept of globalization accelerated the transfer of the trade from the local point to the international dimension. In today's information age, besides getting the information, it is important to use the information effectively and create value. This context increased the value of the innovation that means renewal of science and technology that provide economical and social benefits and identifies a process. The goal of innovation is positive change, to make someone or something better. Innovation leading to increased productivity is the fundamental source of increasing wealth in an economy. Hence innovation is the most important factor for countries that guarantees employment growth, sustainable growth, social welfare and the quality of life. International competition and sustainable profitability which are the sources of growth have increased the importance of Research and Development (R&D) expenditure. So for this, a good R&D level is required for whole countries. The increase of the R&D level forms a basis for the innovation to move. The main scope of this study is to investigate the inter-relations between the basic building blocks of economy and industry nowadays: R&D, innovation, productivity and growth. While defining this inter-relation, it is important to account for the roles of the variables to explain each other. In this study, firstly developments about the innovation and afterward R&D activities of developing and developed countries in the world and Turkey have been discussed.

OP-046

**Technological Progress, Innovation and Economic Growth, The Case of Turkey \***

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This paper focuses on the influence of technological progress and innovation on the Turkish economy. The economic structure of Turkey has changed dramatically over the last three and a half decades during which technology had become a crucial endogenous variable in aggregate production function. The new technology investments brought with them high productivity rates and rapid, positive economic growth. The inter-relation between technological progress and economic growth is summarized and analyzed using quantitative methods. The Econometric results show a significant effect of technological progress and innovation on economic growth.

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OP-047

**Intensity of Business Enterprise Research and Development Expenditure and High-Tech Specification in European Manufacturing Sector \***

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Recent theories of endogenous economic growth draw attention to technological innovation created in the research and development (R&) activities to explain the growth process of economies. Accordingly, this study attempt to identify the relationship between the business enterprise (R&D) expenditure and the share of high-tech sector in Europe based on a panel data analysis conducted for European Union countries during the periods from 2000 to 2014. The hypothesis tested in this study is that business enterprise R&D expenditure is very crucial for the economic growth of a country by enhancing the high tech and medium-high sectors of manufacturing. Empirical findings support that there is a strong correlation between business enterprise R&D intensity and the share of high and medium-high manufacturing. Thus, our study concludes that business enterprise R&D expenditure is one of the main sources of improvement in the technological capability of high value-added production and foreign trade in Europe. The important policy implication of the results is that government should be actively engaged to promote research and development activities in business sector. Thus, empirical findings support the public policies towards a creating appropriate incentive for private R&D activities to provide a continued growth in economy depending on innovation.

OP-048

**Innovating General Aviation MRO's Through IT: The Sky Aircraft Management System - SAMS \***

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Airworthiness regulations for civil aircraft oblige excellent operations with strict control procedures. Therefore proper aircraft maintenance and management is a sophisticated multi agent process, involving a growing amount of information processing. While large airlines and their technical organizations are able to handle this flow, private aircraft or smaller fleet owners rely on smaller maintenance, repair and overhaul organizations, which cannot cope with the demanding requirements. Leveraging this situation, an innovative information technology system for General Aviation is proposed herewith, which is integrating all stakeholders in the value chain through information technologies, enabling organizational transformation using business process management and value chain analysis towards sustainability. It is also shown that as an affordable tool the proposed Sky Aircraft Management System - SAMS is capable to transform and integrate all processes, including supply, repair, operation and approval, enabling new capabilities and thus new businesses, constituting a radical innovation framework supporting sustainable development.

OP-049

**The Moderating Effect of Global Competitiveness Index on Dimensions of Logistics Performance Index \***

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The most important assessment tool that demonstrated the comparative situation of countries is Logistics Performance Index (LPI) created by World Bank. This index which has been prepared as a questionnaire consists of six dimensions. These dimensions are Customs: The efficiency of clearance process, Infrastructure: Quality of trade and transport related infrastructure, International Transportation: Capability of arranging competitively priced shipments, Logistics Competence: Competence and quality of Logistics Services, Tracking and Tracing: ability to track and trace your consignments, Timeliness: Carrying out the transports at scheduled time. In this research, moderating

effect of Global Competitiveness Index (GCI) on each dimensions of LPI was measured. The moderating effect was measured by means of hierarchical regression method. As a result of the analysis, the moderating effects on three of the six dimensions have been found as statistically significant. These dimensions are International Transportation: Capability of arranging competitively priced shipments, Tracking and Tracing: ability to track and trace your consignments and Timeliness: Carrying out the transports at scheduled time. Due to not being any research based on the dimensions of two indexes (LPI and GCI) before, this research can be considered as a breakthrough in literature. The most important contribution of this research is that it allows evaluating logistics performance over the top as to increase the size of a country's global competitiveness index. In other words, according to the result of this research, if a country targets to the top level in GCI index, it needs to make important improvements in the following dimensions of logistics services: International Transportation, Tracking and Tracing and Timeliness.

OP-050

**Turkish Passenger Characteristics and Approach to Self Service Applications Provided by Turkish Air Transport Corporations \***

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This article provides a different look at aviation corporate management, which has intense competition in today's market conditions. The purpose of the study is to provide innovative solutions to aviation corporate management, which can benefit and contribute to the development of strategic plans. In the study, we examined self-service applications and products that have been under operation in the last 20 years globally in the aviation sector. The use of self-service applications in the global aviation sector was evaluated, with comparisons drawn to the Turkish aviation market. Self-service products and services along with global and local passenger usage were compared regarding factors such as confidence and culture. Usage of such applications were analyzed and evaluated concerning benefits and drawbacks. Data concerning Turkish passenger characteristics, capabilities, preferences and trends were gathered via survey, which helped to establish a baseline including strategic management recommendations for the Turkish aviation corporate management.

OP-051

**Incentive Mechanisms in Industrial Development: An Evaluation Through Defence and Aviation Industry of Ankara \***

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There is an ongoing debate about the dynamics of technological catch-up of domestic firms in an increasingly globalized and uncertain world economy. Incentive mechanisms are one of the routes of these debates. Incentives which are related to the overall market conditions and the structure of competition, as well as government policies guide the allocation of resources and the effort to develop new knowledge. Governments often play an important role as providers of the information and technology sources, science parks, clusters, the relationship between industry and university/research institutions, financial support to innovative enterprises, promoting exports etc. This paper explores the extent of incentive and support mechanisms which shape government policies and firm strategies in terms of industrial development through the case of defence and aviation industry of Ankara. The defence and aviation industry is a special sector among others in many respects. The firms in the sector invest heavily in R&D and innovation. The industry is heavily regulated and protected, and public instruments such as R&D procurement and offset agreements are commonly used to support national interests and domestic firms. Through the last 20 years, Turkish defence and aviation industry has determined its direction as meeting its requirements more domestically and having an international regional market. Incentive and support mechanisms are important to ensure the development and sustainability of this uptrend and performance. In this respect, this study will examine the related incentive mechanisms by various institutions and the exploitation level of firms. The relation between the incentive exploitation

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level of the firms and the firm characteristics such as, firm size, age, quality of the labour, innovative capacity and the firm performance such as increase in turnover, exports etc. through firm surveys conducted with defence and aviation companies in Ankara will be evaluated.

OP-052

**Human Capital and Innovation Capacity of Firms in Defense and Aviation Industry in Ankara \***

*Bilge Armatlı Köroğlu, Tanyel Özelçi Ecerel*

*Gazi University*

In recent years innovation has become a well-recognised determinant of growth in firms and regions. Recent studies on high-tech industrial districts reveal the significance of local knowledge accumulation and local innovation capacity for development and economic growth, and human capital is widely believed to be a main source of knowledge and skill in the innovation process. Although the literature lacks a clear measure of human capital, education and training have been used as proxies to measure it. R&D personnel can produce innovation directly in the R&D department. On the other hand, non-R&D personnel, mainly engineers and managers, play complementary role in improving process technology and product. Innovation processes in defence and aviation industry rely/depend on production technology and cost reduction, and innovations occur mainly through the application of existing knowledge on problem-solving activities. In the context of the paper the relationship between human capital and innovation capacity is researched in defence and aviation industry in Ankara. The paper constructed on field survey data of 100 organizations which returned with full information interview forms. On one hand, the innovation activities of firms and the number of patents and the share of R&D expenditures as the main indicators of innovation capacity are analysed. On the other hand, the share of engineers in workforce, R&D workers and their share in the workforce and training programs are analysed as the proxies of human capital. Results of the study show that the human capital is positively correlated with innovation capacity of firms in defence and aviation industry.

OP-053

**Measuring or Support? AiR -a Pilot Project on Support Systems for Innovation In Industrial Automation Companies \***

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Various methods to assess innovation are used in companies and organizations. It has been shown that in companies with low understanding of innovation, the use of some auditing methods create a "survey fatigue" that can make the assessment results unreliable. Additionally, the auditing tend to hinder the process that transforms assessment results into valuables for the assessed companies in terms of e.g. learning, goal formulation and operationalization. Based on a concrete example, this paper explores how innovation assessment can be considered a tripartite audit process designed to support learning and increased cultural support for innovation, consisting of the assessment tool - the audit (what), the users - the auditors (who), the process of executing the tool - the auditing (how). The awareness of the notion 'innovation' among the 70 industrial companies in the Automation Region Network in mid-Sweden are typically low, and as a response to that a pilot study project Automation Innovation Region (AiR) started in 2013 to develop support for innovation. During one year 2014/2015, employees in five companies (N= 44) participated in the study. The project developed a process combining a photo-based workshop on innovation, three workshops with themes on innovation culture, a web based weekly assessment tool, Innowatch, and a quarterly survey. The tools focus on innovation culture (what), the process highlights reflection, learning and integration (how) on assessment results from the perspective of individual, group and organisational (who) perspective. The goal was a learning based audit process that supports the companies to independently continue their work for increased innovativeness

after the formal assessment process. This paper present the tools developed and the results from the pilot study as a base for discussion on auditing as a tool that supports learning and development of an organisational culture for increased innovativeness in established organisations.

**OP-054**

**Increasing Importance of Entrepreneurship and Support and Facilities Provided to Entrepreneurs in Turkey \***

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In the literature of business administration, an entrepreneurship potential that a state owns has been seen as a driving force in the development of that state for a long time. That the state pursues and monitors encouraging policies facilitates the business for the people with entrepreneurial spirit assuming risk. According to the index results for the 2013 realized by the Global Entrepreneurship Monitor (Global Entrepreneurship Monitor - GEM), Turkey has more entrepreneurial potential than the world average and the average of developed countries (<http://www.blogteb.com/turkiye%e2%80%99de-entrepreneurship-potential-rising/>). 32% of the Turkish population (people) is planning to set up a business within three years. Entrepreneurship is seen as a career by young people. This potential should be directed and supported in right way. The fact that the large enterprises leading their industries (sectors) in developed countries is evident that they grow with government supports. The Supports, exemptions, exceptions and discounts provided by the state for entrepreneurs make the entrepreneurial spirit sustainable. Within the framework of relevant legal regulations in Turkey, the material size of the work is observed seriously. The amenities provided to entrepreneurs can be summarized in the form of exemptions, exceptions and discounts, donations and grants. In terms of business continuity, it can be said that the problems exist in the training and consulting services. In this study, conveniences and supports provided to entrepreneurs under the legislation in our country have been analyzed. Mainly, supports and exemptions have been discussed within the scope of Technopark and KOSGEB (Small and Medium Enterprises Development and Supports Administration). You also need to increase the consulting and mentoring services for SMEs. For example, the incubation centers in the Technology Development Zones can play an active role for SMEs which have difficulties in meeting costs with respect to consulting services.

**OP-055**

**Comparative Analysis in the Frame of Business Establishment Criteria and Entrepreneurship Education from the Viewpoint of Economy Policies Supported by Innovative Entrepreneurship \***

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The effectiveness of innovative entrepreneurship activities depends on formation of entrepreneurship policies and optimum usage of the policy tools. In the study, among numerous policy tools effecting application in the frame of entrepreneurship policies, entrepreneurship education and business establishment criteria tools, are analyzed with examples from the world and Turkey. Development of innovative entrepreneurship activities aiming at growth is made possible by generalizing educational programs and easing business establishment criteria. Thereby, positive relation between economic growth and entrepreneurship gets stronger.

Doing Business Index figures composed of Starting Business, Dealing with Construction Permits, Getting Electricity, Registering Property, Getting Credit, Protecting Investors Having Minor Share, Paying Taxes, Trading Across Borders, Enforcing Contracts and Resolving Insolvency, and entrepreneurship education approach, will be analyzed compared with the examples from the world. Entrepreneurship policies have major role in successful applications of countries' economy policies. Innovations in education and business establishment policies have direct effect on entrepreneurship policies.

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Policies targeting to decrease difficulties in establishing business encourage potential entrepreneurs. The education policies have importance by means of developing entrepreneurship culture and increasing awareness.

**OP-056**

**An Investigation of the Effects of Open Leadership to Organizational Innovativeness and Corporate Entrepreneurship \***

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Studies on different leadership styles have a long history in the field of organizational research. Being one of the determinants of how things work in the organization, different leadership styles such as transactional, transformational or authentic leadership have different effects on organizational outcomes. On the other hand, with the widespread increase in the use of different communication channels and in the ease of access to information, the information age has brought its own leadership requirements (Tiwana, 1999). The present study is designed to assess the effects of leadership on individual and organizational performance through the mediation of employee behaviors by comparing open leadership with other approaches to leadership. Adopting a survey methodology, data from a total of 422 participants were gathered through convenience sampling. "Open Leadership" is assessed with reference to the dimensions of the approach put forward by Li (2001). Other leadership scales included in the models are as follows: "Transactional Leadership" by Bass and Avolio (1995), "Transformational Leadership" by Peng-Cheng et al. (2008), "Relationship Oriented Leadership" by Brown et al. (2002) and "Knowledge Management" by Tiwana (1999). The scale used to assess "Organizational Innovativeness" was designed by Hurt et al. (1977) and "Corporate Entrepreneurship" by Zahra (1991). Factor structure of the scales and reliabilities were assessed, demographic analyses, difference tests, linear and hierarchical regression analyses were carried out using SPSS. Mediation models were tested using the methodology proposed by Baron and Kenny (1986). It is apparent that open leadership is an approach that supports entrepreneurship, yet not so frequently observed in Turkey, compared to other leadership styles. The results are elaborated in the discussion section and several propositions are put forward in order to support open leadership with the aim of disseminating a culture of entrepreneurship in organizations.

**OP-057**

**Determination of Innovative Activities in the Dried Fruit Exporter Companies: The Case of Aegean Region \***

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Variable and competitive conditions in today's business world make it difficult for companies to capture sustainable success. Supporting with innovative approaches of the activities of companies may allow them to be successful in the competitive market by creating differences. Companies apply innovative activities to be different in their products and services, in the production and management processes, marketing approaches. In addition, innovative activities are important to increase the commercial performances of the export companies. In dried fruit production and world trade, Turkey is the world leader. The share of exports in this sector of Turkey is around 11%. The share of dried figs and sultanas exported from Aegean Region is quite big in this success. Therefore, application in our study has been applied to manufacturing and exporting companies in dried fruit sector in Aegean Region.

The aim of our study is to identify innovative activities and to reveal management characteristics of the companies in this sector. Therefore questions on age, number of employees, r&d department, patent, utility model, know-how, support projects have been asked to the dried fruit exporter companies and data on innovative activities of the companies were collected by questionnaire. The research has been applied to dried fruit manufacturing and exporting companies registered

to Aegean Exporters' Union. Data was analyzed using SPSS version 18.0. According to the results, it has been observed that companies involved in this research have high innovation average on product, process, marketing and organizational structure. There is no relationship between the size of companies with innovative activities. There is relationship among R & D department possession, benefit from the new marketing methods, to generate new ideas of employees and obtaining advanced technology vehicles and equipment. Furthermore, the average of marketing innovations of the companies varies according to the utilization of the grant programs.

## OP-058

### Designing an Innovation Engine Model and a Software Tool to Meet Large Organisations Challenges with SMEs Capabilities, a Pilot Study \*

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Innovation models and innovation software tools are mechanisms designed to support innovation and collaboration activities. However, innovation models tend to be limited to close innovation or their implementation is not cost-effective for SMEs, while innovation software tools lack features for the collaboration of multiple organizations. Improved models and appropriate, well designed, software tools could address large organizations' challenges with SMEs capabilities, better foster innovation activities and encourage economic growth and jobs creation. This study piloted two 1.5-hour-workshop with 12 Enterprise Systems MSc students to design an innovation model and a software tool with PICTIVE participatory design technique. In the first workshop participants received a talk about innovation and were separated into three groups of four people. Each group was provided with one of three scenarios: the design of a robot exploring Mars, the design of an adrenaline auto-injector for severe allergies or the design of a new ambulance. Groups brainstormed ideas and created a diagram of the components that an innovation model should include to provide an effective collaboration between organizations. In the second workshop, groups implemented their model in an innovation software tool using participatory design. Two researchers observed the workshops and took notes of the group presentations. Three main components comprised their innovation models: Large organizations, SMEs and other institutions, and components for the management of the collaboration. Groups suggested to implement their model in a web site portal with features that support the definition of the challenge, the involvement of different stakeholders, sections to capture large organizations' needs and SMEs' capabilities, features to support the identification of the best partners, the best collaboration agreement and the management of intellectual property. Results were very insightful towards the design of an innovation engine model and towards the use of this methodology with innovation-expert participants.

## OP-059

### A Study on Ergonomic Awareness Among Workers Performing Manual Material Handling Activities \*

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Manual material handling (MMH) is the most common cause of musculoskeletal disorders (MSDs) and low back pain (LBP). It involves manual lifting, lowering, carrying, pushing and pulling loads. This study has two main objectives, first: to investigate the level of ergonomics awareness at a steelworks company especially the level of MMH activities among the workers; second, to identify the body parts pain experienced by the workers as a result of MMH using self-report survey. The respondents for the study were selected from the production area. There were 32 respondents who answered questionnaires regarding ergonomics awareness and reported their body pains through Body

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Parts Symptom Survey (BPSS) included in the 5-scale Likert questionnaires. Based on the self-reported survey, 7 subjects were chosen to be observed through Rapid Upper Limb Assessment (RULA). Evaluation of ergonomic awareness on MMH amongst workers on research area shows that they possess a moderate ergonomics awareness level (mean score 2.97). The BPSS used in this research provides the insight of discomfort issue amongst workers. Nine workers who are working at loading and collection bay were detected to have LBP and MSD problem symptoms. Based on RULA observations on work stations and MMH motions, it was found that the MMH methods used is on level 4. This means that the current method employed should be investigated and immediate changes should be applied. It is recommended that the management should put more effort to increase workers ergonomics awareness especially during MMH activities, to re-examine the MMH activities and redesign the work flow or the workstations.

## OP-060

### A Concept Analysis of Innovation in Nursing \*

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**Aim:** Innovation in nursing has become an increasingly important concept in nursing literature. Changing demographics, new diseases increase the need for healthcare. A nurse who can adapt to such changes will be able to offer more quality, comprehensive personalized care, survive actively in the health team by gaining new roles/responsibilities.

**Methods:** Walker and Avant's well-established method of concept analysis was employed to clarify of concept of innovation in nursing.

**Results:** Innovation occurs in order to meet a requirement/to fill a gap. In the concept analysis, definitions of the innovation in different fields as well as nursing were reviewed, it was found out that it is associated with the concepts "novelty, creativity, change". While the concept of innovation has an important place in the instruction, research, practices of nursing, there are multiple definitions in nursing literature. These multiple definitions show that the concept isn't clear. Innovation is defined as "starting the use of new methods in social, cultural, administrative environments to adapt changing conditions". According to International Council of Nurses, innovation is the process of developing new approaches, technologies, ways of working. Innovation isn't a new concept in nursing profession. Throughout the world, nurses participate in innovative actions in order to improve the results of the care of health people, patients, to reduce expenses. Innovation in nursing is fundamental to ensure, develop the quality of care. In this context, innovation is used in nursing to produce information, protect health, prevent diseases, offer individualized care. Innovation processes, it is required to have a well-trained nurse labor, a service management system that will allow such labor force to head towards innovation.

**Conclusion:** It can be seen that some medical terms are used in the field of health are loan words or they are used in Turkish with an incorrect equivalence. To use a common terminology, it is needed to clarify concept of innovation, nursing education programs, health professionals should pay strict attention to correct use of that concept. Accordingly, it should be maintained that nurses are able to participate in innovative actions at professional life, reflect them in professional practices.

## OP-061

### Health Problems and Help Seeking Behavior at the Internet \*

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**Introduction:** Interest in the internet as a communication tool for health-related information is growing rapidly. The profile of online health consumers can be broadly defined as patients, patients' friends/



relatives and citizens in general. However, little is known about how people use the internet in relation to other sources for health information. **Methods:** This article examines literature and research findings about the seeking health behavior, internet and discusses the importance of subject. **Results:** The internet is an important resource for health information. Health-related websites have gained popularity increasingly. Recent reports suggest that about four in 10 adults and one in four adolescents have used the internet to access health information in the previous year. Online health information has been giving opportunity to consumers and health care professionals for interactive health communication approach. Medical care seekers appear to be using the internet to enhance their medical care; they report using the information online to diagnose a problem and feel more comfortable about their health provider's advice given the information found on the Internet. Access to reliable disease information online has been linked to reduced anxiety, increased feelings of self-efficacy, and decreases in utilization of ambulatory care. Therefore health-related websites have the potential to powerfully influence the attitudes and behavior of consumers. In a national survey in the Netherlands, 81% of people aged 65-75 years used the Internet and 54% used the Internet for health information. Understanding who is more likely to use the Internet as a health information tool is an important aspect of understanding how the Internet is transforming medical care. **Conclusion:** People are using the internet for healthcare information, little is known about how this information affects their health behaviors. Thus, addressing the needs of this population in term of health related internet searches is vital. For that reason, the authorities, health administrators and even web site developers shall learn about the behaviors of live process and people's during online health information search.

OP-062

**The Role of Health Literacy in Access to Online Health Information \***

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**Introduction:** In recent years, the size of online information about health and diseases is increasing every passing day with the increasing use of technologies which facilitate access to information. However, health literacy plays a big role in selecting and using existing information in a correct way. **Methods:** This article examines literature, research findings about the role of health literacy in access to online health information, discusses the importance of subject. **Results:** It is a known fact that online health information, messages, news affect health behaviors of individuals. It is also observed that the number of websites that cover online health information news is increasing every day. Individuals can access to such health information using search engines and use the information in their lives without questioning the accuracy of information. Accordingly, when the data of "Information Society Statistics" of the State Planning Organization of Turkey is examined, it can be seen that 45.1% of people use online health information to get information about health, 75% of people with chronic diseases exercise care, treatment methods that they learn online. Although the access to online health information is that high, unsatisfactory/problematical health literacy is 64.6%, satisfactory, excellent health literacy is 35.4% according to the findings of the Health Literacy Survey of Turkish Health Union (2014). Low health literacy of an individual causes obtaining online health information from incorrect resources, misinterpreting such information, affecting health decision-making process in a negative way. **Conclusion:** Advancements in the information technology make it easier for an individual to access to online health information, expand the use of such information increasingly. Considering the magnitude of online health information, it is required for an individual to have high-level health literacy to access to correct information. It is an inevitable fact that increasing the knowledge of individuals, society about the importance of health literacy will contribute to correct analysis of online health information. In this context, it is recommended to ensure the cooperation among health, education and information technology industries and improve health literacy.

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OP-063

**Entrepreneurship: Is it an Addiction? \***

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**Introduction:** Today, entrepreneurship is growing rapidly and has become a very popular field of research in various social science disciplines and economic policy. Expected basic characteristics for the entrepreneurs is that: initiating a life of self-determination and independence, hardworking and persistent in goal striving, establishing a social network, taking the risk of failure. This study aimed to evaluate in terms of entrepreneurship addiction. **Methods:** In this study the authors aimed to review this area. The articles that are related with entrepreneurship, addiction, mental health were searched by key words in PubMed, Medline, EBSCOHost, PsycINFO, Turkish Medline, Çukurova Index Databases and in Google Scholar and those appropriate for this review were used by authors. **Results:** Addiction has typically been used to describe a physiological, psychological, behavioral dependence whereby a person is addicted to a stimulus. Often entrepreneurs are thought to be a good intermediate gambling. Gamblers and entrepreneurs shows a similar based on the risk of getting a large part of their jobs. Both profiles are also aim to make money. It must take risks if it is to make money. Trial and courage to succeed is also available both the entrepreneur and the gambling addict. The difference the gambling addict and entrepreneurs is that gambling addict is often discouraged from instinct and luck, while entrepreneurs is discouraged from experience and knowledge, products and information about the market. **Conclusion:** Addiction is actually the dark side of entrepreneurship. High motivation to work in the business life and to produce is very important. But entrepreneurship can be thought of as a behavioral addiction individuals can bring results with psychologically troubled. **References:** 1. Dorado S, Ventresca MJ. Crescive entrepreneurship in complex social problems: Institutional conditions for entrepreneurial engagement. Journal of Business Venturing 28 (2013) 69–82.

OP-064

**Finite Element Modelling of Ultrasonic Assisted Turning of Ti6Al4 Alloy \***

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Improvements in the aviation industry raised the usage of titanium and its alloys. Reason of using titanium alloys are superior mechanical properties, high strength-to-density ratio, fatigue and corrosion resistance at moderately high temperatures. All these superior properties comes with a main disadvantage poor machinability of titanium alloy. Titanium alloys machining generates extensive heat at cutting edge and this results in poor tool life. Titanium cutting parameters are also limited because of fire risks of the alloy. Previous works shows that Ultrasonic assisted turning (UAT) technique gives promising results at aviation materials. UAT changes the relationship between tool and work piece, reduces cutting forces and temperatures. UAT provides better surface finish and roundness. At this study Ti6Al4 alloy examined, machining of Ti6Al4 alloy investigated by literature review and 2D FE analysis performed to understand effects of UAT on turning process. UAT simulation results are compared to conventional turning simulation results and experimental results performed by other researchers. This method has some limitations but it is confirmed that UAT technique alters cutting conditions at specific cutting parameters.

OP-065

**Experimental Study of Effects of Ultrasonic Waves on Heat Distribution in Gaseous Medium \***

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Effect of ultrasonically generated forced convection on heat distribution in gaseous medium was experimentally investigated. In the experiment, as an ultrasound source, a piezoelectric transducer which has 28 KHz resonance frequency was used. Transducer was placed behind heat source and ran in sweeping mode from frequency 28 985 Hz to 27 397 Hz at about 20W power. 50  $\Omega$  chrome-nickel resistance heater wire of a hairdryer was used under 220V AC voltage as a heat source and its power is adjusted about 100W by a dimmer. The experiments were carried out two set-ups; one of them is in open environment and other is indoor environment. To observe distribution of heat that is generated by heat source, thermal distribution on A3 sized paper that was placed in test environment was monitored by FLIR A20 thermal camera. When both heat source was running and fan was running with heat source, the heat distributions induced by ultrasound were compared with that of other. It can be concluded that ultrasonic waves could have effect on heat distribution in gaseous medium and it carries heat in propagating direction of itself.

OP-066

**A Microstrip Patch Antenna Design for Breast Cancer Detection \***

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Breast cancer affects many women and has a fatal conclusions if it does not cure correctly. Early diagnosis is the most important parameter to detect and interfere cancer tissue. Some of methods for breast cancer detection are X-ray mammography, MRI and ultrasound. However, they have some limitations. For example; between 4 and 34% of all breast cancers are missed because of poor malignant/benign cancer tissue contrast. Microwave imaging to detect breast cancer is a promising method and there are many works in this area. All materials have different permittivity and conductivity. In this work, a 3D breast structure has different permittivity and conductivity is modelled in HFSS and a microstrip patch antenna operating at 2.45 GHz is designed and substrate material is FR4 ( $\epsilon_r=4.4$  F/m). Slotting on microstrip patch, imaging quality is increased. About this, electric field, magnetic field distribution and current density on the antenna are evaluated.

OP-067

**Examination of Surface Tracking on Polyurethane Foam Insulators \***

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In this research, surface degradation of foam insulators was investigated ASTM D2303 test conditions. Surface tracking on organic solid insulators is one of the main reasons for failure in high voltage systems. Due to various factors, such as humidity, pollution, ice load, increase in local voltage, it is hard to estimate the lifetime of an insulator.

To determine the model parameters, several tests are performed according to the ASTM D2303 accelerated inclined plane tracking test method by investigating the breakdown times of polyurethane foam under various external conditions generated artificially in the laboratory.

Foam insulation materials have to suffer several degradation mechanisms throughout their service life under high voltage. Surface tracking is one of these severe mechanisms which can lead to a total breakdown of the insulator. All tests were performed according to inclined plane tracking test IPTT. The

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IPTT attempts to simulate the tracking behaviour observed on foam insulators in a controlled manner so that comparisons between the external effects.

Electrical insulation capacity of polyurethane foam insulators have been measured by using ASTM D2303 test method. Polyurethane foams have 2-3 times better dielectric strength than air. The breakdown strength decreases with the thickness of the foam. The foam breakdown stress depends on the void size and distribution. The high density foams, with smaller void diameter, have higher breakdown stress. Life time of the foam insulator depends on surface degradation, surface degradation depends on diameter of void in foam insulator.

OP-068

**Technology Acceptance in Health Care: An Integrative Review of Predictive Factors and Intervention Programs \***

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The acceptance and increasing utilization of technological innovations in health care are crucially beneficial for both health care professionals and patients during the diagnosis and treatment processes. The literature includes various intervention programs aiming to increase technology acceptance in this field. In this review, studies investigating the factors influencing the technology acceptance and recent interventions intending to enhance the technology usage in the field are covered. Generally, theory of planned behavior, technology acceptance model, diffusion of innovation theory and unified theory of technology acceptance cover the most distinguished concepts and constructs to understand attitudes towards technological innovations. Influencing factors may differ for health care professionals and patients. While perceived benefits of technological innovations may be the most distinctive factor for health care professionals, ease of use is of big importance for patients. Perceived ease of use is affected by personal norms and perceived control beliefs. Suspicions of confidentiality and privacy are strong influencing factors for refusing technology usage for patients. Considering all these factors is necessary while designing intervention programs to enhance technology acceptance in health care. In the conclusion, the paper discusses whether the intervention programs originate from previously covered theoretical concepts and constructs.

OP-069

**An Enterprise Systems Model to Deliver Innovation in the Healthcare Industry Based on Cognitive and Social-Tech Engineering \***

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An optimal enterprise system to foster innovation is based on people, process and technology. However, current enterprise systems lack a significant involvement of the human aspects. An innovation model can incorporate those three components to provide greater value to stakeholders, drive organizational growth, gain a competitive advantage and achieve greater end-user satisfaction. We investigated how an enterprise systems model for open innovation could be created based on existing innovation socio-technical frameworks and how that model may benefit the UK National Health Service (NHS). We carried out a literature review of enterprise systems models, cognitive and social-tech engineering and innovation management. Two researchers undertook a thematic analysis of 46 academic papers. Themes included business sectors, types of innovation strategy and the use of cognitive and social-tech engineering elements. Results show that little application of innovation models within the healthcare sector has been undertaken to foster innovation. We suggest that existing innovation frameworks such as the Innovation Pentathlon Framework, the NASA's partnering incentive and the Tesco club card scheme may be the basis for the creation of a healthcare innovation model that incorporates substantive human aspects, including human cognition and human reward. Since the cost of missing medical appointments in the NHS is around \$1000 million dollars per year, our innovation model may be implemented to improve patient attendance to family doctors and hospital appointments. The model strategy comprises rewarding people with shopping vouchers (Tesco club card points or nectar points) each time they confirm or cancel a medical appointment online or by SMS text message. With this model, the NHS would

improve the management of their resources, may improve the quality of service and may have higher user satisfaction. Nevertheless, future challenges may include the adaptation of current NHS business processes and the management of the collaboration with private organizations.

## OP-070

### **Environmental Regulation Becomes Restriction or a Cause for Innovation – A case of Toyota Prius and Nissan Leaf \***

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This study aims to investigate whether environmental regulations become obstacles or a cause for innovation in Japan by examining some empirical evidences on how environmental regulations affect the course and character of technological change through innovative activities of industry in Japan. Available literature shows that it is rather very difficult to measure the stringency of environmental regulations and its effects on subsequent innovations at aggregate levels. As a result, this study adopted detailed case studies to overcome the problems of previous empirical studies due to their aggregate nature and to understand well the nature of the relationship between environmental regulation and innovation. In this paper, we picked up the cases such as Toyota Prius and Nissan Leaf to study and examine the impacts of environmental regulation on innovation.

## OP-071

### **SME Firm Performance - Financial Innovation and Challenges \***

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Without uncertainty SMEs have become the significant clout of sustained, instantaneous and bracing growth of Nigeria economy. Moreover, SMEs have performed an unparalleled role in advancing Nigeria economic growth, and serve as a breeding ground for entrepreneurs and a provider of solutions to address the problems of unemployment in all consuming labours and promoting marketing growth. An opportunity for the healthy advancement of small and medium-sized enterprises (SMEs) in Nigeria was in relation to the transformation and expansion policy due to brisk evolution of global economy. But with the global economic integration, the small and medium-sized enterprises operating environment is facing tremendous changes and more intense competition. Hence, the reason for this paper is to present the sources of SME firm financing, conceptualize its financing challenges, source causes, with objectives to exploit the innovative ways to improve financing provision via crowdsourcing of financing and necessity to provide regulatory environment that will support it for the growth and advancement of SMEs prospectively. Likewise, it is an essential strategy that would assist entrepreneurs to remain much motivated towards promoting his line of work. Moreover, it will reassure an individual to become a successful entrepreneur. This study will add to the existing literature in the academic area of entrepreneurship and at the same time offers a springboard that will provide an impulsion for empirical inquiry in this field. Besides, it offers important information and methods that would help entrepreneurs on how crowdfunding can serve as a source of financing provision and the positive impact on Small and medium enterprises (SMEs) firm performance.

## OP-072

### **Effect of Management Factor's on Employee Job Satisfaction; an Application in the Telecommunication Sector \***

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In this study, effects of management approach and leadership style on employees job satisfaction, both explicating and representing on

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the basis of employees who work in the telecommunication sector. Within the scope of study, samples are selected from sub manager employees who work in a nationwide organisation which carries on telecommunication sector. At the stage of application of survey comeback are taken from 202 employees.

To interpret how to be perceived from employees Manager's Leadership styles and management approaches "Ekvall and Arvonen Leadership scale" was used; to evaluate employees job satisfaction "Minnesota Job Satisfaction Survey" is preferred. Employee performance is thought together job satisfaction and motivation. Therefore organisations focused on continuous development and growth should manage perception of employees who works in the strategic plans such as near and far targets, technology, company policies and investment decisions. How compatible perspectives of leaders/managers and expectations of employees? Do Leadership style and management approach affect employees job satisfaction? Does Employee job satisfaction make any significant change in regard to demographical features? The study look for an answer of this questions in general terms.

## OP-073

### **Upper Echelon Theory Revisited: The relationship between CEO Personal Characteristics and Financial Leverage Decision \***

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From the upper echelons perspective, we investigate the financial leverage decision of publicly listed companies in Bursa Malaysia for the period from 2002 to 2011. Using pooled OLS and fixed-effect regressions, we examine the impacts of CEO personal characteristics on financial leverage. Our measures of CEO personal characteristics such as CEO overconfidence based on CEO profile photo, CEO age, and CEO prior experience are significantly and negatively related to leverage. However, CEO education level and CEO tenure are significantly and positively related to leverage. Furthermore, we partition our sample of companies based on CEO age and CEO education level. In the CEO-age group, we find that female CEOs are greater risk takers as compared to male CEOs in Malaysia. With respect to CEO education level, we show that younger CEOs, female CEOs, and longer-serving CEOs are risk takers and more aggressive. This paper contributes to the debate of the UET as well as determinants of leverage decision from several dimensions. First, this is the first study that investigates the impacts of CEO personal characteristics on financial leverage of Malaysian firms. Second, we make the first attempt by classifying CEO certain characteristic (age and educational level) into groups to make a further comparison on the impact of CEO personal characteristics on financial leverage. Third, this study uses a larger data sample and a longer study period than the previous studies in the literature. Fourth, the paper also makes a methodological contribution. This study employs different methods (pooled OLS regression and fixed effects panel regression) for the analysis. It is hoped that the result of this paper can fill the gap of the literature on the relationship between CEO personal characteristics and financial leverage as explained by Upper Echelon Theory

## OP-074

### **The Determination of Panel Causality Analysis on the Relationship Between Economic Growth and Primary Energy Resources Consumption of Turkey and Central Asian Turkish Republics \***

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Energy is an important factor effecting the economic development of the countries. The energy dependence is increasing with economic growth. This relationship between growth and energy consumption is especially important

for energy dependent countries. Sustainable economic growth is dependent on meeting the increasing energy demand at the same rate. Relationship between energy and economic growth plays a key role in the creation of the countries' energy policies. In a further aspect, if there is no relationship between energy consumption and growth, the possibility of negative impact of energy conservation policies on the growth, such as energy tax, energy saving policy, energy pricing policy, is eliminated. Therefore, limited energy resources against increasing energy need of the countries, foreign-source dependency for energy of many countries and environmental/ecological factors in the production, bring the energy issues more important and sensitive position. In this respect, the determination of relationship between economic consumption and economic growth in terms of both Turkey's foreign-source dependency for the primary energy sources (coal, oil, gas), and Central Asia Turkish Republics' rich hydrocarbon resources and geopolitical position is the focus of this study. In this context, this paper aims to investigate the relationship between energy consumption and economic growth in seven countries during the period of 1992–2012. For this purpose, it is analyzed cointegration and long-run causality relationship between these variables by adopting a Vector Error Correction Model for cointegrated panel data with Turkey, Azerbaijan, Kazakhstan, Turkmenistan, Tajikistan, Uzbekistan and Kyrgyzstan.

OP-075

**Emigration of Innovative Workforce in the Light of Patent Data ✱**

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The study uses patent data statistics to reveal emigration of innovative workforce issue which has adverse effects on the economies of countries. Elimination of spillover effects that might be obtained by the new inventions from a Schumpeterian point of view, loss of the most important segment of human capital and characteristics of emigrant receiving countries are also discussed in the study. The study therefore aims to stress the importance of retaining innovative workforce and attract as many as possible to improve potential of economy by using data analysis and literature review methods.

OP-076

**Analysis of Innovation-Based Human Resources for Sustainable Development ✱**

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The main objective of sustainable development is, by providing conscious consumption of resources in a way that allow to meet the needs of today and the future, to direct development policy through such a balance. Institutions and corporations, have to develop new products, as well as continuously improving production methods and services in order to protect their sustainability in a rapidly changing competitive environment. Developing new products or improving them along with providing services and developing production, will also be carried out by human resources. A research study analyzing a survey of the world's largest 500 companies indicates that 80 % of the value of a company was to create tangible assets 40 years ago. Today, however, exactly the opposite, large companies constitute 80 % of their values to property rights and high-quality of human resources. Nowadays, innovation-based solution rates increased in the companies and organizations because of the new human resources practices. Companies employ human resources that can develop innovative ideas, evaluate opportunities and are highly motivated for the development of products and services or innovative initiatives of existing products and services (Chen ve Huang 2009). The number of studies conducted in the subjects of technological and overall innovation, human resource management and entrepreneurship has increased in recent years. In this study, innovation-based human resources analysis employed by Western and Far East Asia countries will be analysed through content analysis and the subject will be evaluated in terms of Turkey. In this study, the linear relationship between sustainable development and innovation-based human resources will be put forward. Through multiple

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analysis methods, innovation-based human resources analysis will be handled especially in developing countries, training of human resources in this context will be an important opportunity for the future as in the example of Japan and South Korea.

OP-077

**Organisational Knowledge: The Panacea to NGO-operations ✱**

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This paper is based on literature search. The contribution of organisational knowledge is widely acknowledged. It is one of the indispensable assets for the organisations. Organisations (NGOs) may use it for their internal administration and external operations. Thus this knowledge is used for the socio-economic development of the beneficiaries. Organisational knowledge harbours in the policies, procedures, experiences of the organisations. The employees are also the good sources of organisational knowledge. This paper understands that organisational knowledge may be used for the mobilisation of resources, it helps the organisation for their capacity development, organisations may use this knowledge to gain strategic advantages and organisational knowledge helps the organisations to respond with the changing environment. Future researchers may empirically examine the issues in the context of NGOs, or any For-Profit organisation

OP-078

**A Study on the Assessment Framework for the Novelty of Idea Generated by the Analogical Thinking ✱**

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**Background:** Although there have been lots of educational program for creating new ideas, the assessment of the novelty is still controversial issue. As an ideation tool, the analogical thinking enables conceptual change which is a crucial aspect of creativity. In this regard, the use of analogies is an important instrument for the novel idea generation. Thus, this study suggests the assessment framework on the novelty of the idea generated from analogical thinking. **Methodology:** Analogies are generated by superficial or structural similarity from the memory. For creating the new idea by analogy, the novelty is regarded as the domain-changing influenced by structural consistency with the already known cases. Consequently, we designed the assessment framework based on the latent semantic analysis of the domains and the consistency of the underlying mechanism between the source cases and the new idea. **Data sourcing:** Data was collected by the 14 subjects who participated in the workshop for this study. All subjects were asked to read the 25 cases of the collective intelligence services. During the workshop, subjects were asked to categorize each case based on the underlying mechanism of the business by group discussion, then individually created new service idea by analogical thinking. **Result:** The novelty of ideas created in ideation workshops varies greatly. In total, 12 ideas were created and 6 of them are assessed as novel. Among the other 6 ideas, 4 ideas have high superficial similarity in terms of the domain of idea, and 2 ideas have neither superficial nor structural similarity from the source cases. **Conclusion:** The proposed assessment framework is unable to be one-size fits-all method. However, it is important that this approach enables to overcome the issue of current evaluation method that used to depending on the professionals rating based on subjective judgement.

OP-079

**A Review of Business Analytics: A Business Enabler or Another Passing Fad ✱**

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Business Analytics has emerged as a potential business enabler in both public and private sectors and is one of the fastest growing fields. By implementing

Business Analytics initiatives in their organizations, decision makers can integrate disparate data sources, predict trends, improve performance, see key performance indicators, identify business opportunities, and make better and informed decisions. The purpose of this study is twofold: First, it provides a working definition, background, and a review of Business Analytics (BA) / Business Intelligence (BI) / Big Data theory and practice. Secondly, it discusses if BA/BI/big data is another passing fad or a business enabler.

**OP-080**

**Innovation Culture and Strategic Human Resource Management in Public and Private Sector Within the Framework of Employee Ownership ❄**

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Innovation describes the transformation in the business fields and production philosophy. The differences between the countries and regions in terms of management, science, engineering, technology and labour quality have become the factors that explain the complexity dynamics of the 21st century. Hence; increasing the international competitive power of the local firms in the framework of regional development politics, improving entrepreneurship and innovation capacity in local area are highly important in this century. In this process strategic human resource management (SHRM) are two critical activities for companies. Some vehicles are required to realize these activities as regulating the environment and for development. These vehicles are firstly cyberparks, industrial clusters and organized industrial zones. In this study we discuss the effects of ITT in developing new organized business and production facilities with the mediator roles of knowledge and HRM as building the innovation culture in the infrastructure of the industrial zones. Employees of medium and large scale institutions from different regional levels that are in the process of setting standards for the institutionalization and organization make up the main mass of our samples. A printed questionnaire was created to collect data associated with the variables in the research. These forms were handed to the employees who were selected using the convenience sampling method and were actively involved in the working life. In this way, a total of 461 questionnaires were collected from Marmara, Central Anatolia and Aegean Region.

**OP-081**

**Leadership in TVET for the 21st Century: Challenges, Roles and Characteristics ❄**

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Technical Vocational Education and Training (TVET) was often judge as a place for those who only fated to do menial and dirty jobs resulted from their poor academic achievement. The so judgmental assumption has been long mingling in the orthodox view of education landscape and it made the heart of those who: run it, in it, feel it, felt so crush and stymied. TVET was often disregard as a significant player in academic orientation and those statement has been slowly discarded since many are aware that TVET are the best providers of knowledgeable and skilled workers in the 21st century. The curvy path of TVET for sailing in this 21st century challenges were geared by more than 'will' and 'gut' of a leaders to plot and positioned TVET in it class. This primary research attempted to explore the challenges, roles and leadership characteristics from the single view perception of a higher ranking leader in TVET institution. The finding of this study suggested besides of having two ears, arms and feet, leader have to ensure their followers are not out of reach by portray what best describe as 'necessary'. Specifically, the findings was presented in two set formats; quotations of participant opinion in qualitative form and tabular format for quantitative forms.

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**OP-082**

**Innovation and Labor Productivity in BRICS Countries: Panel Causality and Co-integration ❄**

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Schumpeter defined innovation as new goods which do not exist in the market, a new production method, a new market or raw material source, a new field of business, a new financial method or an new organization style. From Schumpeter's definition to today innovation appeared in different forms and was an important factor in economic growth equations. Although it is generally accepted that innovation increases the efficiency and productivity of capital, it can also be said that it increases the productivity of labor force as well. Recently the ease and prevalence of performing research through the internet, as well as developments in information and communication technologies had a positive effect on load and productivity of labor force accelerated workflow and also increased the efficiency of production processes and output amounts. Developments of information and communication technologies especially provided development opportunities for countries having high population and labor force and also a high development potential due to an increase in efficiency and productivity of labor force and helped them to have faster and easier economic growth or development. In this study, the aim is to research the effects of innovation on labor productivity for the 5 countries defined as BRICS (Brazil, Russia, India, China, South Africa) which have drawn attention in recent years due to their economic performances by using panel data and dynamic panel data methods. The stationarity of the variables were determined by annual data of the 2000-2012 period and the first and second generation unit root tests. Initially, economic growth equations estimated, and then short-run relationships were researched by causality tests while long term relationships were analyzed by using dynamic and non-dynamic panel data methods such as panel co-integration. The study results are expected to show a positive relationship between innovation and labor productivity.

**OP-083**

**Determinants of Innovation Performance: A Resource-Based Study ❄**

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This study aims to investigate the determinants of innovation performance in firms. Hence, the relationship between several constructs that are innovation strategy, formal structure, customer and supplier relationships, innovation culture, and technological capabilities and innovation performance were tested. A survey that was conducted on a total of 194 firms revealed that innovation strategy and technological capabilities contributed more greatly to innovation performance. However, in contrast to the proposition of innovation literature that suggests a positive and significant relationship between formal organizational structure and innovation performance, a significant and negative relationship was found. The implication is that firms are likely to improve their innovation performance as they increasingly reconfigure their resource-base with regard to strategy development and technological investments.

**OP-084**

**Effects of Innovation Strategy on Firm Performance: A Study Conducted on Manufacturing Firms in Turkey ❄**

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The purpose of this study is to explore the effects of innovation strategy on firm performance. The author was inspired from the study conducted by Akman and Yılmaz (2008). The study was conducted on 197 manufacturing companies which are members of Istanbul Chamber of Industry. The cronbach alpha values of the dimensions of the measures were calculated for the reliability of

the scale. Factor analyses were conducted to figure out factor loadings of each the dimensions of the measures. Multiple regression analysis was conducted to explore the effects of the independent variable of innovation strategy (aggressiveness, analysis, defensiveness, futurity, proactiveness, riskiness and technological orientation) on the dependent variable (firm performance).

First of all, there are 20 questions in the questionnaire to understand the general state and approach of firms to innovation. They were developed by the author after a detailed literature review. There are questions about the respondent at the end of the questionnaire.

Innovation strategy measure was determined by Akman and Yilmaz (2008) from Venkatraman's typology (1989). It is composed of aggressiveness, analysis, defensiveness, futurity, proactiveness and riskiness dimensions. The questions of the firm performance measure were determined by the author based on the Balanced Scorecard approach.

The firm performance measure is composed of four dimensions namely financial performance, customer performance, internal businesses performance and learning and growth performance. The five point Likert scale is used for all measures.

The hypotheses of the study are as follows:

H1: Aggressiveness has a positive impact on firm performance

H2: Analysis has a positive impact on firm performance

H3: Defensiveness has a positive impact on firm performance

H4: Futurity has a positive impact on firm performance

H5: Proactiveness has a positive impact on firm performance

H6: Riskiness has a positive impact on firm performance

#### OP-085

##### **The Relationship Between Intellectual Capital, Innovative Work Behavior and Business Performance Reflection \***

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Twentieth century was the century of information, innovation and changes. Services sector expanded, and industrial sector stayed in the background as a result of the progress in these fields. In this process, while the financial capital became influential within the businesses, "intellectual capital" concept began to come into prominence. Market value of a business consists of the combination of the owned book value and the intellectual capital (Pike, Rylander, Roos, 2002: 658). Intellectual capital is the total sum of everything known by everybody within a business, and it provides the business with competitive advantage in the market (Stewart, 1991; Bontis, Serenko, 2004: 185). If the businesses with such an important strength direct intellectual capital towards the innovative work behavior, they can survive for longer years and obtain competitive advantage. Innovative work behavior is described as an individual behavior that allows employees to add and introduce new and beneficial ideas, processes and products to their working environment (Mura et al., 2012). Main purpose of this study is to identify the relationship between the intellectual capital owned by the businesses and innovative work behaviors, and to find out how to reflect that relationship on the business performance. Studies carried out so far points out the presence of a positive relation between intellectual capital and business performance (Bontis, 1998; Bontis, Keow, Richardson, 2000; Bontis ve diğerleri, 2005; Goh, 2005; Erkuş, 2006; Peng, Pike, Roos, 2007; Akdağ, 2012). Building up such relation depends on transferring the intellectual capital into innovation. And if the intellectual capital transferred into innovation is managed successfully within the businesses, it triggers performance development (Narvekar, Jain, 2006: 178-179).

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#### OP-086

##### **CSR Practice and Sustainability of Business Performance: Evidence from the Global Financial Centre of China \***

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The Hong Kong Special Administrative Region of China has long been positioned not only as an international capital market but also as the global financial centre for China. To position themselves for overseas expansions, major emerging enterprises in China have been listed with the Stock Exchange of Hong Kong and follow internationally accepted corporate practices. In particular, there have been emphases by multinationals around the world on Corporate Social Responsibility (CSR) practices for the potential benefits to enhance business performance as demonstrated in prior studies. The aim of this paper is to explore the relationship between sustainability of business performance and CSR practice among listed companies in Hong Kong. We have investigated and made comparisons between two groups of listed companies in Hong Kong -- those included the Hang Seng Corporate Sustainability Index and the other major ones. It is found that there is a significant difference between two groups in the sample in terms of business growth and overall profitability. However, a direct association between adoption of CSR practices and sustainability of business performance can only be observed over an extended period of time. The authors argue that CSR practices should be assessed over their long-term viability; however, there is not yet strong evidence that those selected in the Index are assured for their environmental and social sustainability in a longer run.

#### OP-087

##### **The Effects of Innovative Features of Women Managers on Their Business Performance: The Case of Food Exporter Companies in Aegean Region \***

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The main aim of this research is to determine perceptions of innovative features of women managers in food exporter companies in Aegean Region on their business performance. The questionnaire prepared on this subject was applied between January 2015 – March 2015 to the 123 women managers working in food exporter companies in Aegean Region. At the end of the research in the 20 scope proposition collected in the eight factors; it was determined that within the framework of innovative features, women managers ownership of the mission and vision, care about career development (f1), to see opportunities, to be brave, to be open to learning (f2), to be conciliatory and to be convincing (f3), to be prescience and to be creative (f4), to be solution-oriented and to be open to innovation (f5), to care about cooperation, research and high communication (f6), to be emotional and abstract thinking (f7), high confidence and to be competitive (f8), affected business performances of them in the advanced positive way. For the 20 propositions, the alpha value of Cronbach is 0,726. Eight factors overall variance is explained at %79,174 levels.

#### OP-088

##### **Literature Search Consisting of the Areas of Six Sigma's Usage \***

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In today's world when rivalry is gathering speed; profit maximization and consumer satisfaction have become the main targets of the enterprises. One of the most important methods affecting these targets of the enterprises is six sigma approach. This approach accepts the consumer as the focal point.

Six sigma approach is such a model that is adapted by various companies throughout the world due to its consumer-oriented approach and this model aims the continuation of company success. Six sigma aims to reach a perfect level by actualizing 3,4 error rate in one million productions. Six sigma is a strategy using statistical methods to provide, measure, analyze, renovate and control optimal efficiency in business processes. Most important function of six sigma is to minimize the variables in the production process. This name of "six sigma" is given by Mikel Harry that the variability term is measured by standard deviation in statistics and standard deviation is symbolized by the "small sigma"  $\sigma$  symbol and six sigma approach requires to make the assessment by statistical techniques on behalf of managing and restructuring the business processes. Six sigma is an optimization technique and its largest difference is to be a flexible system aiming to optimize both the performance and the managerial skill. The primary objection of six sigma is to minimize the errors and to actualize a quality level in the groove and its philosophy consists of the aims of reducing costs, increasing customer satisfaction, actualizing the optimization of business processes and increasing the efficiency of the employees. Six sigma approach, with the most areas of application is observed in production sector, is combined of the junction of the best and most successful sides of the previous methods.

**OP-089**

**What Could Entrepreneurship do for Sustainable Development? A Corporate Social Responsibility-Based Approach \***

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Development can be defined as eliminating poverty, unemployment and inequality. Sustainability is associated with satisfying a national economy's needs for natural resources without compromising generations. Sustainable development is defined as "the development that meets the needs of present without comprising the ability of future generations to meet their own needs" (UN Brundtland Report, 1987). Governments and the agencies grouped under the umbrella of the United Nations, World Trade Organization, International Monetary Fund and World Bank have failed in their attempts to get rid of under-development. Large corporations with their power and economic strength have taken a dominant position in societies to take much more responsibility for development. At this point, it could be put forward that large corporations could be the initial point if there is a tendency for getting involved in development which could inspire entrepreneurs. Entrepreneurship is seen as an alternative to unemployment and poverty which could be the panacea for development. Today, there is a growing perception among entrepreneurs that success cannot be achieved solely through maximizing short-term profits and the growing importance of corporate social responsibility on business success and positive impact on society is accepted. Entrepreneurship and small businesses are the basics of economy, responsible for breakthrough innovations that influence the growth of free market economy and its general performance.

This research aims to serve as an impetus for multidisciplinary research and further discussion on the entrepreneurial implications of CSR for sustainable development. Moreover, possible reasons of why entrepreneurs should be involved in sustainable development and related theories from the literature in order to reveal the motivations for sustainable development and underlying dimensions in decision making will be discussed. The study will provide a unique contribution to the literature as an example from a CSR-based perspective for the related field.

**OP-090**

**System Thinking Approach in Solving Problems of Technology Transfer Process \***

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The role of knowledge creators and accumulation like universities is consistently growing and obtaining new forms of operation. New knowledge

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and ideas, used by researchers themselves, i.e. remaining separated from innovation, are economically worthless. Competitive research may result in scientific carrier and high worldwide reputation, but remaining with negligible relevance for the innovation system. For a stationary economy, where entrepreneurs are engaged in reproducing the given, this poses no difficulty. But as soon as development enters, and comparative advantages based on given products and technologies are eroded by newly industrializing economies, the situation transforms fundamentally. The production of new knowledge, to become an economic activity with high value added, has to become embedded into new combinations of resources. This requires a structural coupling of the science with economic development level of society. The traditional division of labour and functions between academic science and academic teaching, industry and society (applied research, development, innovation, societal benefits) is obsolete. Today university activities crosses traditional boundaries through linkages with the socially-economic development level, it should develop new ways to interact between each other. Less developed countries have an advantage to adopt new knowledge created by technology leaders. The role of efficient technology transfer system, providing conducive to spillovers environment and society ready to promote technological adoption, implementation and application determines also new role for regional universities or research centres. The ability and capacity to absorb secondary or tacit knowledge may increase competitiveness on different levels. The primary aim of this paper is to systemize industry-university-policy linkages in less developed country into proper model scheme. The new prepared model shows new assessment of effectiveness factors of any technology transfer systems on its way to introduce top-down, or better bottom-up approach.

**OP-091**

**The Impact of External Collaborations on Firm Innovation Performance: Evidence from Turkey \***

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<sup>2</sup>*Bahçeşehir University*

This paper aims to understand the impact of collaborations on the firm innovation performance. Although some of the previous studies support that external collaborations of firms improve their innovation capabilities, our knowledge on the impact of collaborations on firm innovation performance is still limited. In this research, using innovation survey carried out by Turkish Statistical Institute in 2009 to measure the innovation activities of firms in Turkey between 2006 and 2008, we aim to understand how collaborations influence the innovation performance of firms. We introduce a new indicator to measure the innovation performance of firms which is simply based on the perception of firms regarding to the impacts of innovation. In order to create performance indicators we conducted a factor analysis to group the firms' perceptions on the impacts of innovation. Factor analysis gives us two basic impact of innovation: product and process oriented impacts of innovation. We find out a positive relationship between external collaboration and product oriented impacts of innovation. In other words, firms engaged in external collaboration during the innovation process observe better improvements in their products and markets. External collaboration also brings improvements to the production process of firms.

**OP-092**

**Participatory New Product Development - A Framework for Truly Collaborative and Continuous Innovation Design \***

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Recently we are witnessing significant changes in the way that consumers communicate with each other and interact with brands, primarily driven by the rise of online social networks, Web 2.0 revolution and smartphones. However, the gap between ideation and new product development remains in terms of both designers' and marketers' ability to adapt to these trends and to the levels of stakeholder engagement into every stage of the new product development (NPD) process. Although marketers are increasingly being

interested in collaborative innovation with customers and users, a more participatory approach to NPD is only being attempted recently by a limited number of maverick companies - e.g. P&G in consumer markets and Cisco Systems in industrial markets. Even this attempt is essentially flawed in bringing the producer and the user together in the value development process as it only attempts to patch things up with linear, hierarchical and fragmented interventions rather than appreciating the continuous, cyclical, and engaging nature of a truly collaborative product design process. By bringing participatory systems design in engineering and value co-creation perspectives of marketing disciplines together, this paper discusses the fundamentals of a conceptual framework of innovation management for value co-development that engages all the stakeholders to the process. This framework proposes a trans-disciplinary approach that: a. integrates traditionally fragmented steps of value development (i.e. market research, NPD, marketing communications, consumption); b. engages developers (i.e. designers and researchers), marketers (i.e. actors in the vertical and horizontal value-chain), and users (i.e. consumers, clients) throughout the relationship as equal partners during these steps; 3. gives voice to all concerned stakeholders (i.e. participation opportunity to the marginalized groups); and 4. closes the loop of value development as an ongoing and emerging process.

**OP-093**

**Sustainability in Construction Sector ✱**

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The concept of "Sustainability" defined for the first time by Brudland Report which is published in 1989 by United Nations of the World Commission on Environment and Development has been placed at the center of several studies and practices. Adaptation of environmental and energy policies supporting economic development not threatening natural life, in international community makes states, establishments, institutions and business world and non-governmental organizations and other stakeholders force to act at this way. Eco-friendly and smart buildings are the result of sustainable environmental policies in construction sector which is widely responsible for consumption of natural resource and environmental pollution. Sustainable constructions called smart buildings or green buildings are hi-tech buildings with their control and automation systems. For this kind of building design, architects, engineers, landscape architects and product manufacturers, energy consultants, building users and project managers such as local administrators are working together. The identification of potential threats and opportunities by following these technologies, the selection of appropriate technological capabilities for the company and industry, the acquisition of these technologies from internal or external companies and usage of them are required for strategic management of technology. The firms which making investments on research and development acts (R&D) in the construction industry of the future in the world by using strategic technology management and which can make its power sustainable to compete in the global market will be able to find a place for themselves in the market.

**OP-094**

**Stress-Strain State of Two Diagonal Cavities Weighty Inclining Layered Massif System with Shears in Terms of Elastic-Creep Deformations ✱**

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In this paper investigated the stress-strain state of two diagonal cavity of arbitrary cross-sectional shape and the depth of a weighty inclining massif with system slots in terms of elastic deformation and elastic-creep rocks. On the basis of anisotropic mechanical-mathematical model of inclining multilayer massif with a doubly periodic system of slots studied numerically the patterns of distribution of elastic-creep stresses and shears near two diagonal cavities of derived

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shape and the depth of the finite element method in generalized plane strain. Calculation algorithm is designed and compiled software package for the study of the elastic-creep state of adjacent cavities of derived depth and shapes. Conducted multivariate numerical calculation and analysis of the effect on the components of stresses and shears near the cavities geometrics, physical parameters, and creep properties of rocks.

**OP-095**

**Study of Granulated Blast Furnace Slag as Fine Aggregates in Concrete for Sustainable Infrastructure ✱**

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Growing environmental restrictions to the exploitation of sand from river beds have resulted in a search for alternatives particularly near the larger metropolitan areas. This has brought in severe strains on the availability of sand forcing the construction industry to look for alternative construction materials without compromising the strength criteria of concrete. Granulated blast furnace slags are one of the promising sustainable solutions as they are obtained as solid wastes generated by industry. Hence it reduces the solid waste disposal problem and other environmental issues. Present experimental work explores the possibility of using GBFS as replacement of natural sand in concrete. In this study an attempt is done to understand the variation in compressive strength of concrete with GBFS content. Along with that cost analysis is also done to suggest the most optimized percentage of GBFS to be used in various situations.

**OP-096**

**Split Tensile Strength of Self-Compacting Concrete Containing Coal Bottom Ash ✱**

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Self-Compacting Concrete (SCC) is a flowing mixture that consolidates under its own weight and a highly workable concrete that can flow through densely reinforced and complex structural elements. The source material like a granular aggregate is often used in construction difficult to find and the price is expensive. In developing country like Malaysia, the demand of natural sand is quite high to the rapid infrastructural growth. Therefore, the aim of this paper is to study the effect of coal bottom ash on the split tensile strength of self-compacting concrete. The test involved designation of 0%, 10%, 20% and 30% of coal bottom ash (CBA) as a partial replacement of fine aggregate with variation of water cement ratio of 0.35, 0.40 and 0.45. The results show that slump flow, L-box ratio and sieve segregation resistance of SCC mixtures with CBA are decreased, while T500 slump flow time increased with the increase of CBA replacement level. The highest tensile strength of SCC is 4.25 MPa achieved by control sample with the water cement ratio of 0.35 at the age 28 days. The increment of CBA replacement levels resulted in the reduction of split tensile strength and density of SCC. Meanwhile, the increment of water cement ratio was reduced the split tensile strength of SCC.



OP-097

**Development of Building Damage Functions for Big Earthquakes in Turkey \***

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The current work is an attempt to predict building reactions to big earthquakes using real data collected from surveys carried out after the occurrence of earthquakes. With the development of building damage functions for big earthquakes in Turkey one can predict the damage levels as a function of earthquakes's intensity and the building parameters. Our model is based on neural networks techniques which allow for the non-linear correlations to be taken into account. We analyse data collected for damaged buildings after the three big earthquakes: Avcilar (17.08.1999; Mw = 7.4), Dinar (01.10.1995; Mw = 6.0) and Erzincan (13.03.1992; Mw = 6.8). The current model includes the main important factors affecting the health of any structure, namely, age, number of stories, the height of the building, and the related engineering parameters. Our method of damage prediction is based on several earthquakes and buildings with different damage levels. The obtained results show that there is a strong correlation between the strength of the earthquake, the basic building parameters and the damage level. The obtained building damage function is essential for future plans and regulations for new constructions and can be considered as an essential module for hazards mitigation systems.

OP-098

**Innovative Crisis Management in Construction: Approaches and the Process \***

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Crisis management is a process that includes to catch and evaluate crisis signals and needs to take and implement necessary precautions in order to overcome the crisis with a minimal damage. Detecting the early warning signals of crisis contributes firms to hinder the occurrence of the crisis and to evade it without huge financial losses. The other factors that contribute construction firms to evade the crisis in a zero-defect approach can be listed as follows: (i) catching indirect signals before the crisis, (ii) developing proactive methods to defend themselves against crisis by means of these signals, (iii) taking crisis under control, (iv) taking the required measures after the crisis for the recovery of the firm, and lastly (v) recording the lessons learned from the crisis. Construction firms that can manage the crisis well can quit it with a minimum loss and can expand their market shares after the crisis has passed away. In other words, firms that can escape from the crisis with zero or less damage may strategically have competitive advantages over the existing rivals. Considering all the above issues, this study will first describe the concept of crisis management in terms of the construction industry and then introduce the related objectives and characteristics. Finally, as the aim of the current study, both innovative crisis management approaches and the corresponding process will be discussed in a detailed manner from the perspective of construction companies. In fact, this is a virgin area in the construction management literature and thus can contribute to the creative and innovative management of companies under potential crises in micro and macro levels. As a conclusion, this study will attempt to reveal how construction firms can manage crises better and turn to their former positions in the short term through innovation-based means.

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OP-099

**Diversity Management Research as a Strategy for Sustainable Development in the Third World \***

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Diversity has to do with the totality of the Differences and Similarities in different variables in the Management Sciences like Culture, Development, Management goals of equitable and fair employment, legislation, demographic characteristics such as sex, marital status, as highest education qualification, status and durations worked or tenure etc. However, the interest in this paper is Management Diversity in general and Human Resource Management Diversity Research in particular as strategies for Sustainable Development in the Third World. Management Diversity is the totality of the differences and similarities in all the Managerial activities in an organization bothering on Planning, Organizing, Staffing, Leading and Controlling. The Effect of Management Diversity is to increase the Productivity and Employee Morale of people in Public Sector Organization and the Profitability and Employee Morale of people in the Private Sector Organizations. The increase in the three performance variables namely Productivity or the ratio of output over input, Probability or the extent to which Sales Revenue exceeds the cost and Employee Morale or the extent to which the workers are happy all lead to Economic Growth. The concept of Economic Development is seen as one of the four pillars of Sustainable Development. Sustainable Development means that Development is dynamic, continuous and ongoing. It is defined as meeting the needs of the present generation without hampering the needs of future generations. All the 8 needs of Maslow are included. The specific objectives which are all achieved are to do a Theoretical Review of Management Diversity Research, to do a Theoretical Review of Sustainable Development in the Third World and to do a Theoretical Analysis to show how Management Diversity Research could be used as a strategy for Sustainable Development in the Third World: Experiences and Future Plans of Intellectuals.

OP-100

**Factors Affecting the Internationalization Process of Small and Medium Enterprises (SMEs) \***

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As a result of the rapid prevalence of Information Technologies, disappearance of the borders between countries as a sequel of globalization and the fast increase in the number of Small and Medium Sized Enterprises (SMEs), products and services similar to each other are emerging. Within such a context, firms are striving to increase the demand for their products and gain attention through differentiation both in local and global markets. Due to its important role in international trade of countries, SMEs are being considered as major role players in economies and therefore became an attractive area to explore by researchers. The literature on the internationalization of firms is predominantly build on research from the US and western European countries while there is a few number of research conducted in Turkey (Bal and Kunday, 2014; Şengüler, 2013; Konaklıoğlu, 2012; Kalyoncu and Üner, 2010; Ölmez, 2006). However, the literature on Turkish firms is at its infancy and there still is the need for further research. Additionally, the internationalization of SMEs has been mostly investigated within the marketing literature and there is a lack on this subject within the Management and Organization literature. Setting out from this need, the aim of this paper is to investigate the entrepreneurial skills of the entrepreneur who founded the SME, the motive of the entrepreneur for starting the business, the innovativeness of the firm, and the relationship of these factors with the internationalization of firms. The sample of the research consists of entrepreneurs who have been reached via the Global Entrepreneurship Monitor (GEM) study in 80 countries between the years 2000-2012. Hierarchical Regression Model was used to test the hypothesis initially at macro level including each country and later only for Turkey. Research findings and implications are discussed.

OP-101

**The Process of International Opportunity Development: Entrepreneurial Behaviour of Turkish Firm in Romania \***

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The arena of entrepreneurial behaviour of MNCs from new emerging markets and how they behave in the process of opportunity discovery and exploitation in other new emerging markets is almost untouched. High competition among MNCs from the West and emerging markets has enforced firms from new emerging markets like Turkey to turn their entrepreneurial activities such as acquisition to markets in the new emerging markets. The question under the attention of this effort is how firms from new emerging markets manage their entrepreneurships in other new emerging markets. Unlike the internationalization of Western firms, firms from new emerging markets lack sufficient knowledge and therefore their quick and high investment by acquisitions is assumed as entrepreneurial behavior contaminated with a very high risk. How such firms manage the process of opportunity discovery and exploitation becomes an interesting topic for research. The study aims to develop a theoretical frame for analysis of these firms entrepreneurial behavior when developing new opportunity in another new emerging market. The study employs business network view for deeper understanding of opportunity development in the process of before and after acquisition. The analytical frame holds not only relationships between business firms, it also includes political and social units into the business network. The paper employs a process view on internationalization of firm and the relationship in this construction grasps the three elements of knowledge, resource commitment and legitimacy. The theoretical frame is to analyze the empirical case study of a Turkish firm's opportunity discovery by internationalization in Romania during the period of 1998-2014. The study aims to promote opportunity for improving the understanding of how firms from new emerging markets manage such opportunity when acquiring a firm from another new emerging market.

OP-102

**The Barriers to Increasing the Productivity in Expatriate Management: Examples in The World and Turkey \***

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In the current frame of global rivalry perceptive, one of the significant formulas of multinational enterprises to obtain competitive advantage is having human resources who are well-equipped and having mobile ability. This situation increases the need for those who have the quality to work abroad for a definite duration, and bring forward the issue of Expatriate Management (EM) for Human Resources Management (HRM). An expatriate is a highly skilled worker with unique expertise. S/He is sent to work in another unit of the same company located in a foreign country, generally on a temporarily. The right choose and management of assigned personnel effectively in this way is a quite important matter because of the global knowledge that is provides in areas such as production, management, marketing, but at the same time it is a problem because of high costs it may cause. The most common and costly problem facing multinationals in doing business in over seas countries is the high level failure of expatriates because of the adaptation problems to the new country. The adaptation problem expatriates faced to a large extent may arise from various reasons in many developed and developing countries. This reveals the necessity of differentiation of EM by countries. The aim of this study is to assess the followed policies in different countries in EM on the basis of problems encountered by expatriates and accordingly, to illustrate the EM practices and the point it has reached in Turkey though various examples. There is not any academic study which has been carried out directly in this field. Putting the barriers to increasing the productivity in EM and offering some policies to be followed in removing these barriers are useful for both the success of business employing expatriates and for numerous scholars to study in this field.

OP-103

**Immigrant Entrepreneurs on the World's Successful Global Brands in the Cosmetics Industry (Case Studies: Avon Products and Estée Lauder) \***

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This study investigates the immigrant entrepreneurs on the world's successful global brands in the cosmetics industry from date of creation until the present, through two case studies - Avon Products and Estée Lauder. Research in beauty and cosmetics industry is a thriving global industry (Manko, 1997, Koehn, 2001, Jones, 2008) and the most successful industry during the Great Depression in the early 1930s until the end of World War II (Koehn, 2001, Scanlon, 2006, Jones, 2008). However, there is little literature mentioned about cosmetics brands created by the immigrant entrepreneurs that survived and grow. The purpose of this research is to elaborate on the role of immigrant founders in creating world's successful global brands in the cosmetics industry. The main arguments that make these brands become global and successful rely on; (1) DNA of the brand and its immigrant founder, (2) Performance during crisis period (Great Depression and the World War II), (3) Decision for the internationalization, and (4) Changes of Ownership. All these four arguments relate to innovation that relies on other activities, such as branding, and on marketing knowledge rather than technology (Lopes & Casson, 2007). This study demonstrates the analyses from various historical archives, museums, and library of the brands, annual reports, secondary data, and company documentations. The findings are discussed to close gaps that also contribute to the literature and data in this research field.

OP-104

**Innovation Management in Global Competition and Competitive Advantage \***

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Increasing competition due to the liberalization of world trade has led to the production of goods and services according to new needs arising in the global market. Obtaining an advantageous position in the global competitive environment depends on determining right strategies and creating different values. Dynamic market structure, differing market conditions and the existence of innovative competitors make competition even more intense. Nowadays, objectives such as increasing productivity and profitability, gaining new markets and improving existing market shares are reached through innovation activities. Therefore, companies exert themselves to develop innovative skills, gain sustainable abilities and upgrade their performances. In this context, innovation has been one of the essential elements of competitive advantage. New goods and services must be produced in new ways and by adapting the inside and outside applications to the new developed methods, the organizational processes must be restructured. Not only to produce new goods and services, it is also important to manage it as a process. For determination of innovation performance, it is very significant to address all the factors affecting the innovation management process with a holistic approach. While rightly determining needed technology and management stands out as an important element of innovation management, the human and structural adjustment of the organization is also gaining importance in innovation performance. In the global competitive environment, organizational and managerial innovations are the keys to success for companies. While technology and research and development activities significantly influenced the organizational structure and culture, right innovation management provides a competitive advantage. This study aims to evaluate the impact on the competitive advantage of innovation management by putting out the importance of innovation management.

OP-105

**Reverse Globalization by Internationalization of SME's: Opportunities and Challenges Ahead \***

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Small and medium-sized enterprises (SMEs) are powerhouse of growth, jobs and backbone to the nursery of entrepreneurship globally. These are universally acknowledged as major contributors to GDP and even larger contributors to exports and employment and play a crucial role in the Socio-economic profile of nations. In developing countries, more than 90 per cent of all firms outside the agricultural sector are SME's and micro enterprises, generating a significant portion of GDP. This paper would dwell upon the opportunities and challenges for SME's internationalization, their Policy framework, Finance and Market access along with Socio-Cultural Norms with special perspective to Agrobased and Biotech led SME's. Among major problem identified are absence of adequate and timely banking finance, limited capital, access to international market and knowledge management. SME's play a critical role in the economic and social development of emerging markets and their role needs to be strengthened further in view of their contribution towards fostering equitable growth and employment generation. It is imperative to enhance SME's competitiveness, which requires the creation of enabling legal, regulatory and administrative environment, access to finance and capable institutional structures and most importantly, human capital. In order to transform SME's as an agent of reverse Globalisation, Innovation in processes and Policy is imperative. SME's must embrace global changes in cultural norms so that they can survive and find a place for themselves in the global competitive environment. The most important change needed is in the attitude of the stake holders and the mindset of the institutions which are engaged in the task of small enterprise development. Efforts should be made to take full advantage of opportunities made available by globalization. This is possible only through enhancing efficiency and taking financial literacy on mission model

OP-106

**Systematic Design of an Open Innovation Tool \***

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As the organizations are moving from more traditional "closed innovation" to "open innovation", different methods and tools are being developed and used to take full advantage of open innovation. One such tool "open innovation portals" that are now used by many companies as they offer cost effective and easier access to many innovators all around the world. In previous studies, open innovation concept and open innovation tools in the world were examined. Then, an open innovation survey was conducted in top Turkish companies and the needs for open innovation were discussed with relevant stakeholders. Following detailed studies, an open innovation portal structure is designed using Quality Function Deployment (QFD) method. QFD allows to "listen to the voice of customers" where the design characteristics of products/services and customer requirements are mainly detected. It is used in the systematic design phase to evaluate the requirements of relevant stakeholders. The purpose is to follow the product development process of QFD to assure systematic innovation that the stakeholders for open innovation are identified, stakeholder needs are fully elicited and the identified needs are satisfied by the design structure. The resulting portal design has been currently put into practice by an innovation management system software company which is funded by the Turkish Ministry of Science, Industry and Technology.

OP-107

**Example of Open Innovation: P&G \***

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Open innovation, also known as crowd sourcing or co-creation, is a way for companies to utilize the ideas and strength of the people outside their organization to make improvements in the internal processes or products. Many companies seek input from those people outside their organization for solving some of their trickiest problems. Open innovation help them to drive employee productivity, customer loyalty and better innovation. Open innovation process consists of three main steps. These are concept phase, development phase and practice phase. In the concept phase, research activities are carried out. In the development phase, skills are defined and projects are developed. In the practice phase projects are implemented and exchange of information is accelerated. P&G leads the companies which applied concept of open innovation successfully in the world. Procter & Gamble Co. which is the world's 40th biggest and 84th innovative company created the web site for this propose which is known Connect + Develop to encourage open innovation to help them to drive employee productivity. P&G's open innovation strategy has enabled to establish more than 2,000 successful agreements with innovation partners around the world. C+D already has delivered strategic value all across the Company, and a series of game-changing consumer innovations. This paper firstly aims to describe the open innovation concept and innovation process in the example of P&G and reasons for the necessity of innovation.

OP-108

**Effects of Innovation Types on Performance of Manufacturing Firms in Turkey \***

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The purpose of this study is to explore the effects of innovation types on firm performance. The author was inspired from the study conducted by Günay (2007). The study is conducted on 197 manufacturing companies which are members of Istanbul Chamber of Industry in Turkey. The questionnaire was prepared and sent to general managers of these firms by e-mail.

The hypotheses of the study are as follows:

H1: Product innovation has a positive impact on firm performance.

H2: Process innovation has a positive impact on firm performance.

H3: Marketing innovation has a positive impact on firm performance.

H4: Organizational innovation has a positive impact on firm performance.

First of all, there are 10 questions in the questionnaire to understand the general state and approach of firms to innovation. They are developed by the author after a detailed literature review. There are questions about the respondents at the end of the questionnaire.

Innovation classification types were adopted from the study of Günay (2007) which was based on Oslo Manual (2005). The questions of the innovation performance measure were developed by the author. There are seven questions to determine financial performance, four questions to determine customer performance, nine questions to determine internal business processes performance and six questions to determine learning and growth performance. The cronbach alpha values of the dimensions of the measures were calculated for the reliability of the scale. Factor analyses were conducted to figure out factor loadings of each the dimensions of the measures.

Multiple regression analysis was conducted to explore the effects of the independent variable of innovation types on the dependent variable of firm performance.

OP-109

**Innovation Management System of Ecuador ✱**

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This paper shows and describes the dawn of the innovation management national system in Ecuador and presents the public policies and financial movements made for improve such system. Furthermore, it exhibits a proposal model for the relation and interaction between the participant institutions from de private and public sector in order to follow a triple helix model.

OP-110

**Breaking Free From ‘The Linear’: In Search for Innoveaders ✱**

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The characteristics of the global business environment, in which the organizations are expected to sense-and-respond to the target customers' preferences on the move, have changed drastically. Vigorous attempts to design the 'system' through analyzing the parts seem to have dead-ended given the fact that, today, having the knowledge of the parts is barely enough to predict the outcomes of the upward causality. Innovation, under these circumstances, cannot be reified as something done to organizations via managerial interventions. Our prolonged understanding of leadership is incapable to provide us insight about how to create ingenious organizations in which emergence is giving rise to innovation. This conceptual paper intends to tap into relationship between becoming an innovation-driven organization and the appropriate context of leadership that should be instilled accordingly through incorporation of the assumptions of complexity science into the field.

OP-111

**Drivers of Innovative Constructive Deviance: A Moderated Mediation Analysis ✱**

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The concept of constructive deviance is one of the most striking research areas in recent literature. This concept is defined as any voluntary and intentionally behaviors having three common characteristics: (a) targeting well-being of organization, (b) breaking significant organizational norms and rules, and (c) conform to hypernorms. Innovative constructive deviance, a sub-dimension of constructive deviance, is defined as behaviors which target organizational wellbeing by deviant but creative solutions. Most of the studies on deviance focus on the destructive deviance –the dark side of workplace deviant behaviors. There is a paucity of empirical research on constructive deviance in the recent literature. Therefore, the purpose of this study is to try to uncover the antecedents of Innovative Constructive Deviance in public organizations where obedience as an opposite concept for deviance, is a virtue. We propose a model of complex relations among the risk taking ability- as an independent variable, the networking ability- a mediating variable, the perceived organizational support- a moderating variable, and the innovative constructive deviance- the dependent variable. The sample of this study consists of 172 civil servants working in various sectors in Istanbul. Findings show that, networking ability fully mediates the relationship between risk taking propensity and innovative constructive deviance. On the other hand the proposed moderated mediation analyses was also supported because of the significant interaction between risk taking propensity and perceived organizational support. Managerial and practical implications are forwarded.

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OP-112

**Energy Efficiency in Backbone Networks ✱**

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The topic of energy efficiency in backbone networks has recently gained increasing interest and has become one of the important parts of networking research. The energy consumption of current electronic devices is increasing too fast with the continuous growth of the Internet traffic. Also Information and Communications Technologies (ICT) consume the worldwide energy ranging from 2% to 10% and the consumption of ICT will almost double by 2020. According to many studies, the Internet will use 50% of the world electricity in the near future. In this study, energy efficiency of backbone networks is examined. Besides, the techniques recently used for energy saving in backbone networks are analyzed.

OP-113

**An Investigation on the Parameters That Affect the Performance of Hydrogen Fuel Cell ✱**

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Most of the energy used in the world is obtained from fossil fuels. Some reasons like air and environmental pollution, high energy costs and depletion of fossil fuels, increased the importance of studies about new and renewable energy sources in the world. Among the new and renewable energy sources hydrogen has great importance. Hydrogen which exists in great amounts in the world has the highest energy content per unit mass. The subject of fuel cells is one of the main research topics in hydrogen energy. The purpose of this study, is to analyze the performance of fuel cells. To do this a model of fuel cell is created in Finite element method program. Membrane thickness and electrolyte type of fuel cell is selected as variables.

OP-114

**Power Quality Measurement and Evaluation of a Wind Farm Connected to Distribution Grid ✱**

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Wind power can bring new challenges when it is connected to the power grid. Generated power from wind energy system is always fluctuating due to the fluctuations in the wind. This paper shows a study on Power Quality (PQ) analysis of wind turbines installed in Hatay region and has been working for three years. Power quality parameters such as voltage, current, active, reactive and apparent power and harmonics are measured, analyzed and evaluated taking into consideration IEEE 519-1992 standards. These parameters are continuously measured for three months. The recorded parameters are voltage and current rms values of all single phase for every 10 power frequency cycles, average values of current and voltage harmonics every 3 sec, active, reactive, and apparent power values and the power factor every second.

OP-115

**Thermal Performance of a Domestic Chromium Solar Water Collector with Phase Change Material \***

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In this experimental investigation; domestic type of a 304 stainless steel chromium flat plate solar water collector that can be directly connected to the pressurized city water line system, not to give any negative effects on chemical compositions of the water, has hot water tank inside collector, keep hot water temperature with PCM placed inside the collector during night, not to be needed any maintenance during lifetime and have less price, more lifetime, high thermal efficiency, easier assembling and manufacturing when compared with aluminum and copper type collectors was designed, constructed and tested for the thermal efficiency according to EN (European Union Norms) 12975-2 (Anon., 2003). This collector was tested in the summer conditions (in July, in Adiyaman, Turkey). The collector was tested while fluid (water) stored inside collector during the daytime and nighttime for two days and while fluid flows as 0,02 kg/s.m<sup>2</sup> for 5 hours (10:00 to 15:00) for two different days (periods). Some solar thermal energy was stored for short term period (from day to night) using paraffin (melting temperature point: 55°C, melting latent heat: 50 kcal/kg and density: 900 kg/m<sup>3</sup>) as a phase change material (PCM). Each test was replicated two times. As a result, thermal efficiency of the collector was defined as 12.5% and 62.0% while fluid stored and flows, respectively.

OP-116

**Agarwood Oil Yield as a Result of Changes in Cell Morphology Due to Soaking Process \***

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This study emphasis on the hydration effect (by immersion technique) towards the morphology of agarwood chips. Agarwood chips were obtained from the *Aquilaria Malaccensis* trunk. The effects of hydration also reflected by the oil yield extracted from soaked agarwood chips. Scanning Electron Microscopy (SEM) analysis conducted to evaluate the microstructure of the agarwood chips. The hydration effect was evaluated by varying the soaking time and it is analyzed by its moisture content. The resulting oil yield was obtained from conventional water distillation process. The distillation time was standardized for 96 hours for all samples. Agarwood oil collected and quantify at the end of the distillation process. The total oil yield at different soaking time produces a bell-shaped graph ranging from 0, 7, 14, 21 and 28 days. The maximum oil yield can be obtained by agarwood chips soaked for 14 days. The result can be explained by the morphology of agarwood chips cell. The cell has expanded and finally damage, thus releasing the content to the soaking water. Water enters cell wall through diffusion and increase the turgor pressure. Soaking water become more acidic through time and corrodes the cell wall. This enhances the wall damaging process. However, longer soaking time causes more oil content wasted to the soaking water. It is concluded that the most suitable soaking time for agarwood oil extraction is 14 days. On the other hand, soaking process able to changes the morphology of the agarwood chips in order to enhance the oil yield.

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OP-117

**The Impact of the Solar Irradiation, Collector and the Receiver to the Receiver Losses in Parabolic Dish System \***

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Parabolic Dish (PD) is one of Concentrating Solar Power (CSP) technologies that convert sunlight to electricity. PD has shown the highest efficiency by converting nearly 31.25% of solar radiation into electricity. Therefore, PD has emerged as one of reliable and efficient Renewable Energy (RE) technology. However, the evaluation of PD system performance using experimental approach is costly and time consuming. Therefore, a model has become necessary to predict system performance under several of operating conditions. Nevertheless, current literature on PD modelling is scattered, focusing on individual components and rarely organised in one cohesive report. This paper is to study on the impact of the solar irradiation, collector and receiver of the PD system to the receiver loss. Meanwhile, the value of the rate of heat transfer to the receiver, solar power intercepted by the receiver and receiver losses are evaluated by using a simulation approach. In this study, Matlab Simulink was used as the simulation tool. Simulation result has shown that variations of the solar irradiation on the site and intercept factor influence the value of the rate of heat transfer to the receiver; solar power intercept by a receiver as well as the receiver losses. As a conclusion, receiver losses equal to 0% for the intercept factor equal to 1.0 and show the highest receiver losses value which is 10% for intercept factor equal to 0.9 for low, medium and high level of Direct Normal Irradiation (DNI) data.

OP-118

**Artificial Neural Network and Agility \***

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Data collection and analysis are now part and parcel of virtually all research carried out in economics, politics, technology and medicine. As operations and calculations improve in line with emerging technologies, it is now possible to carry out forward mathematical modelling based on basic criteria by utilizing such technologies. "Artificial Neural Networks and Agility" is a significant area of application making this modelling a viable reality. As artificial neural networks model the human brain, they are capable of providing reasonable solutions quickly for problems which cannot be solved by classical programming. Therefore, their use is widespread and has achieved successful results. This study examines artificial intelligence, artificial intelligence techniques, artificial neural networks, as well as their basic structure and agility.

OP-119

**The Effectiveness of 8 Weeks Physical Activity Programme Among Obese Students \***

*Norkhalid Salimin, Gunathevan Elumalai, Mohd Izwan Shahril, Gobinath Subramaniam*  
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Obesity is now considered a major problem plaguing the country because most Malaysians are obese. Various factors cause obesity. This quasi-experimental study aims to look at the effectiveness of a Physical Activity programme on obese pupils of SJK (T) Barathi, Hutan Melintang for 8 weeks. The respondents are 40 pupils with 20 male and 20 female respondents. Omron Karada Scan Body Composition Monitor HBF-375 was used as an instrument to measure the level of BMI among respondents. National Service physical activity manual was adapted to run in this 8 weeks programme. Descriptive analysis showed that the obesity level of the respondents reduced obviously. BMI levels for 7 respondents (17.5%) of the samples were at normal level. Paired t-test analysis shows significant differences in mean values between pre and post test for male and female respondents. Analysis of independent t-test showed no significant

difference in mean score of post test for the 8 weeks physical activity programme among boys and girls. Physical activities like this should be applied consistently in all schools so that obesity can be prevented.

## OP-120

### **Employment Oriented Case Study of the Individuals with Down Syndrome - Smiling Faces \***

*Mehmet Levent Kocaalan*  
Mehmet Levent Kocaalan

Disadvantaged people in life are born with disabilities. People with intellectual disabilities, education after the age, it is difficult to be employed anywhere. For this reason, it is important to employ people with mental disabilities in jobs they can do. The aim of this study is to create employment for individuals with intellectual disabilities. In this study, individuals with intellectual disabilities review will focus on the creative possibilities of employment. In this project, the social environment of individuals with intellectual disabilities to participate spiritually, to feel good about themselves, their children and their families are provided the opportunities for the creation of financial gain is intended to be more than happy. The above mentioned benefits and mental disabilities can make in the context of ensuring the proper operation of cafe area was thought to be employed. In this context, the project is developed in a cafe working with mental disabilities. This project is coordinated by the Pamukkale University and a partner Denizli Municipality. The working life of individuals with Down syndrome in order to gain the "Smiling Faces" is a "down cafe" format, designed the project. Under this project, the IQ level of 60-80 range and age level is greater than 18 with Down syndrome, Down syndrome, 14 individuals were selected. 7 college student chosen given the necessary training and the first two disabled student services, personal problems, motivation, education, and communication problems are to be responsible for. Also included in the project's family was disabled, 1 day a week in one of the best product they will be asked to issues of pie, cake, pastry, and will actively participate in the project. Used motor skills for individuals with Down syndrome is limited, the service shall be performed special apparatus.

## OP-121

### **Consumers' and Physicians' Perceptions about High Tech Wearable Health Products \***

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As the growing aged-population and increasing chronic diseases lead to ongoing changes in healthcare industry, wearable technologies have been becoming a hot topic in the field of health technology. Mobile health applications that work with wearable technologies enable users gather and store all health and fitness related data in one place. Consumers' acceptance, adoption and usage intention of wearable health products is expected to rise in the near future. This paper aims to reveal the perceptions of users as well as physicians about high tech wearable health technologies. The study will provide a deeper insight about motivations that affect individual's decision to adopt high tech wearable health technologies by extending technology acceptance model (TAM). Perceived risk and compatibility constructs are integrated into the TAM to analyze what determines users and physicians acceptance of wearable health technologies.

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## OP-122

### **A Research for People to Determine the Relationship Between Oral Hygiene and Socio-Economic Status \***

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In this study, we aimed to investigate the relationship between oral hygiene and socio-economic status. Study data were obtained from 160 patients admitted to a private dental clinic within one month using a questionnaire which consisted of socio-economic variables. Dental examination was performed by a dentist and oral hygiene was assessed by hygiene sticks using the Quegley-Hein Index. Statistical analysis was performed using t test, variance analysis, and Kruskal-Wallis test. Our study results suggest that increased education status is positively associated with oral hygiene and poor oral hygiene is associated with reduced income per capita. Preventive dentistry should be supported to increase the awareness of the individuals with low and moderate income.

## OP-123

### **The Evaluation of The Effects of Socio -Demographic Factors on Oral and Dental Health: A Study on The Ages 6-12 \***

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Dental caries are known to represent one of the most important causes of severe health problems both in children and in adolescents. Poor oral hygiene is closely associated with the child's feeding, sleeping, leaning and self-confidence. In this study, we aimed to identify the relationship of oral hygiene with the social life experienced by 6-12 years-old children, and to introduce preventive treatment to these children at an early stage. Study data were obtained from a questionnaire containing demographic questions and conducted on parents of 120 children, and also from results of oral finding following oral medical examinations performed by the dentist. Bacteria plaque index (BPI) which was determined following examination performed by the dentist was also considered as research data. According to results of this research, we are of the opinion that health authorities in Turkey should encourage preventive and implementation of development programs towards public and school-based mouth-dental health care, and that early preventive treatments measures acquired by children would greatly help to reduce state health expenditure on oral health. Furthermore, this study is considered as a preliminary investigation for a project to be carried out by the researchers.

## OP-124

### **Properties of Hardened Concrete Produced by Waste Marble Powder \***

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Marble is industrially processed by being cut, polished, and used for decorative purposes, and thus, economically valuable. In marble quarries, stones are cut as blocks through different methods. During the cutting process, 20-30% of a marble block becomes powder. Marble powder is a waste material generated in considerable amounts in the world. Marble waste leads to a serious environmental problem as well. Therefore, the use of waste marble in the concrete production as an admixture material or aggregate has increasingly become an important issue. In the present study, effect of different usage areas of waste marble on the hardened concrete properties was investigated based on previous studies. In this context, (i) compressive, flexural, and splitting tensile strength, (ii)

modulus of elasticity, (iii) ultrasonic pulse velocity, (iv) Schmidt surface hardness, and lastly (v) sorptivity coefficient/porosity of the hardened concrete, were examined. Comparing all results, the proposition “the marble waste can be used in the production of concrete” was discussed in a detailed manner. As a result, the use of waste marble powder in (i) conventional concrete mix, (ii) self-compacting concrete mix, and (iii) polymer concrete mix, was revealed. Consequently, it was found out that the use of waste marble in the conventional concrete mix as an admixture material or aggregate is suitable as it can improve some properties of the hardened concrete. However, the use of waste marble in the self-compacting and polymer concrete mixes as an admixture material or aggregate is not affected positively in terms of hardened properties of concrete.

**OP-125**

**In Situ Preparation of Resol/ Sepiolite Nanocomposites \***

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In this study, in situ modified phenol formaldehyde resins were prepared from clay (sepiolite) in the presence of base catalyst. Different clay contents (3 wt%, 5wt%, 8 wt%, 10 wt%, 15wt%, 20wt%, 30wt% and 50 wt%) were used to produce sepiolite modified resol nanocomposite resins (SEP-PFNCRs). SEP-PFNCRs were partially cured by heat and the effects of the curing process and the clay content in the resol resin were determined on the spectroscopic, thermal, and microscopic properties of the final products. The structures of the specimens were characterized by means of Fourier Transform Infrared (FTIR-ATR) spectroscopy. Thermal properties of the samples were determined with Thermogravimetric Analyzer (TGA). The dispersion of sepiolite in the resol nanocomposites were examined by X-ray Diffraction (XRD). The obtained samples were also characterized morphologically by Scanning Electron Microscope (SEM).

**OP-126**

**In Situ Copolymerization of Silver Containing Nanocomposites of Pyrrole and Thienyl End Capped Ethoxylated Nonyl Phenol by Iron (III) Chloride \***

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This study presents synthesis of novel block copolymers of thienyl end capped ethoxylated nonyl phenol and polypyrrole with silver nanoparticles via chemical oxidative polymerization by iron (III) chloride. Ethoxylated nonyl phenol (ENP) was reacted with 2-thiophenecarbonyl chloride in order to synthesize a macromonomer containing thienyl end-group (ENP-ThC). Then copolymers of ENP-ThC and pyrrole were synthesized by chemical oxidative polymerization using iron (III) chloride as an oxidant. During this reaction, silver nitrate (AgNO<sub>3</sub>) solution was added in order to increase its conductivity and to give the copolymer anti-microbial property. The synthesized block copolymers (ENP-ThC-b-PPy) with silver nanoparticles were characterized by spectroscopic analysis and the electrical conductivities were investigated with 4-point probe technique. The obtained samples were also characterized morphologically by Scanning Electron Microscope (SEM).

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**OP-127**

**Sustainability for Blast Furnace Slag: Use of Some Construction Wastes \***

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Blast furnace slag is a by-product from blast furnaces used to produce iron. Blast furnace slag has been used extensively as a successful replacement material for Portland cement in concrete materials to improve durability, produce high strength and high performance concrete, and brings environmental and economic benefits together, such as resource conservation and energy savings. Construction wastes define as relatively clean and heterogeneous building materials which are generated from various construction activities. Among them, ceramic, brick, and marble wastes can be included. These kinds of wastes can be used successfully as replacement materials in the cement mortar or concrete mixing. The use of alternative aggregate is a natural step towards solving part of the depletion of natural aggregate, and the alternative aggregate processed from waste materials which would appear to be an even more sensible solution. Recycled aggregates, such as ceramic, brick, and marble wastes, in the blast furnace slag concrete have been investigated in the limited number of studies to date. In the literature, use of these wastes in the concrete produced by blast furnace slag, as replacement materials in cement have not found adequate attention. Therefore, in the present study, the effects of ceramic, brick, and marble wastes used as fine/coarse aggregates on the properties of blast furnace slag investigated. Thus, the contribution of these wastes on the sustainability of blast furnace slag concrete was presented in a detailed manner. Consequently, construction waste aggregates and blast furnace slag can be used to improve the mechanical properties, workability, and chemical resistance of the conventional concrete mixtures. Since the construction waste and blast furnace slag wastes are available in vast amounts in Turkey, it is economically and environmentally suitable to use these materials as aggregates in the production of more durable concrete mixtures.

**OP-128**

**Synthesis of Si-ZnS Core-shell Nanoparticles by Reactive Deposition of Photocatalytic ZnS Layer on the Surface of Carrier Si Nanoparticles in Aerosol Microdrops \***

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In this work, we report on the aerosol synthesis of photocatalytic powder nanostructures of core-shell Si-ZnS particles. Submicron Si particles were prepared in the form of an aqueous dispersion by disintegration of the semiconductor-grade silicon powder in the cavitation Water Jet Mill disintegrator. Adding zinc acetate converted aqueous dispersion medium into a solution of Zn(Ac)<sub>2</sub> in various concentrations. The thus prepared liquid dispersion was then transformed into aerosol microdroplets with an average size of 3.5 microns in the Omron NE-U17 nebulizer. These were subsequently transported by flowing gas into the vigorously stirred aqueous solution of sodium sulfide. At impact of these aerosol “microreactors”, the two liquid reactants produce zinc sulphide. Due to heterogeneous nucleation, the insoluble phase of ZnS is precipitated on the phase surface of the silicon carrier particles contained in the microdroplets. As the amount of Zn(Ac)<sub>2</sub> in a microdroplet is limited, so is the extent of the precipitation reaction and the thickness of the container can

be regulated by  $Zn(Ac)_2$  concentration in the liquid dispersion. The obtained liquid dispersion of core-shell particles of Si-ZnS was desiccated by controlled vacuum sublimation and stabilized in the form of lamellar nanoaggregates with a relatively high surface area. The final material enables easy handling and shows significantly higher photocatalytic activity than  $TiO_2$  Evonik P25 standard.

**OP-129**

**Statistical Evaluation of Urea-Multiwalled Carbon Nanotubes Fertilizer Using Plackett Burman Experimental Design \***

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Paddy growth rate is significantly dependent on application of nitrogenous fertilizer which mainly contributed by urea fertilizer (UF). Nanotechnology advancements in nutrition strategies for plants have attempted to assist plant nutrition for efficient plant growth. The development of carbon nanomaterials including Multi-walled carbon nanotubes (MWCNTs) in conjunction with the advancement in biotechnology has expanded their application area in the field of agriculture. The aim of the work is to identify the significant process parameters to attach UF onto MWCNTs. The UF-MWCNTs was then characterized optically and chemically to confirm their bonding. Comparison study were also conducted between UF-MWCNTs and UF-functionalized MWCNTs on paddy in context of its nitrogen (N) content, growth rate and yield. Functionalization of MWCNTs via nitric acid treatment and chemically treating it with urea has produced novel urea-MWCNTs. The surface functional groups produced during functionalization process are essential for further modification of MWCNTs and facilitate the separation of nanotubes bundles into individual tubes. Optical, vibrational spectroscopy and chemical characterization conducted on the samples using TEM, FT-IR and total N analysis confirmed the successful bonding of urea onto MWCNTs. Plackett-Burman Experimental Design showed, two out of nine investigated parameters (amount of functionalized MWCNTs and percentage of functionalization) were found significant in producing successful attachment of UF onto functionalized MWCNTs. Results from the N content analysis shown a significant increase amount of N in plant for the UF-functionalized MWCNTs compared to the UF-MWCNTs fertilizer. Also, both paddy growth rate and grains yield were 23% and 35% increased using functionalized MWCNTs compared to the non-functionalized MWCNTs.

**OP-130**

**Technical Innovations in Cruise Tourism and Results of Sustainable Approaches \***

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Tourism industry is one of the biggest economic sectors of the world with extraordinary development rates. There are negative and positive ecological, economic and social effects which derive from international tourism. The most important negative effects are mostly on environmental quality and sustainable development perspectives of destinations. Positive effects mostly cover employment and income related issues not only in destination regions but also on the side of tourism product suppliers which are related with neighbouring worldwide economies. Tourism regions and industries base on solid ecology but also on positive economic and social environment of touristic supplies. Based on growing environmental conscience, it is only possible to reach desired positive effects of tourism if negative ecological, economical and socio-cultural effects minimized and by this way innovation wins stronger meaning with the help of sustainable transport. This paper will evaluate innovation methods within cruise sector which has strong growth numbers of tourism and prepare recommendations for the future of cruise tourism in Turkey.

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**OP-131**

**Marketing Efforts Related to Social Media Channels and Mobile Application Usage in Tourism: Case Study in Istanbul \***

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Many companies are following and adapting the technological developments in communication region, with high percentage usage ratios of web page and mobile applications based services, even as linking them on the social media channels. Besides, internet usage and social media has been appeared out as an important channel in every sector. Tourism sector is one of the top sectors in this sense and it is adapting these new social media channel and technological communication tools. Almost, every tourism company in Turkey are updating themselves for catching the new wave. Impressively, internet framework covering the mobile communication is very powerful in Turkey relative to other emerging economies. On the other hand, there are not sufficient data which examine the social media affect on the marketing power in Turkey. But, it has become a necessity to analyze social media's role in the manner of marketing and the effects on sales in tourism sector. Another question also appears: Which social media channel is preferred for the marketing efforts in Turkey or which channels are used by companies for CRM based efforts? Mainly, research, tries to examine the social media and electronic communication effect on marketing in tourism sector. Research method is based on qualitative method and data will be collected from hotel managers. Hotels will be selected from Istanbul Hotels in Turkey. The research will describe the framework of social media and electronic communication usage for the marketing purpose of tourism sector in Turkey that gives acceleration to tourism companies in the manner of benchmarking and road mapping for their future efforts.

**OP-132**

**Art Via Architecture 'Lukisan Kajian' Style in Hybrid Model 'A+AGPD': Observation 'Garis Stroke Line' (gSLine) \***

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This research explores production styles stroke line and pen hatching effects of free hand drawing in 3 Dimensional (3D) illustration drawing called lukisan kajian. The purpose of the study is to compare line hatching effects 'Garis stroke line' (gSLine) between the Art painting drawing with Architecture Graphic Presentation Drawing. Limitation of respondents from the artist's artistic and architectural illustration painter who actively produce illustration (3D) drawing and reference book at Malaysian. 'Garis stroke line' (gSLine) term are used in this research. SIX experts respondents were used as limitation of the study. Issues 'free hand' drawing that is not propotion or 'kejung' among students of art and architecture 'under-graduate' often discussed in journals within and outside Malaysia started in 2007 to 2014. This qualitative research using a phenomenological study design with methodology through triangulation of observation, visual recordings and literature review. Phenomenon (gSLine) was analysed based on the elements of art: line, shape, form, texture and colour in creating 3D illustrations lukisan kajian in free hand drawing style. The findings in the literature, find artistic work known as lukisan pengkaryaan. The paintings drawing by artist illustration graphics architecture, graphics known as 'lukisan perakaan'. The findings of the SIX respondents found that there are three differences (gSLine) between the two disciplines of visual art which in the proportion (visualization), emotion (emosi) and aesthetic (estetik) style or (daya), which are summarized as (dVEE). Research findings found that 4 difference in the quality of the line drawings lukisan perakaan. The findings of the study were collected in order to produce a hybrid model of researchers 'Art + Architecture Graphic Presentation Drawing' (A + AGPD). The study used case study in order to production model process (gSLine) in explaining the 'how' a 3D illustration lukisan kajian (dVEE) can be produced.



OP-133

**Creating a Network of Youth in Nakhon Phanom and Laos PDR. About Sustainable Tourism Development in The Greater Mekong Sub-region \***

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The tourism industry has become significantly important sector in economic cooperation between the countries in the Greater Mekong Sub-region (GMS). A focus on the development of young people as a major force in the development of sustainable tourism would be developed to benefit the economic, social, cultural and environmental needs continuing development together with the GMS countries by creating a network for knowledge sharing. First, the study of attitude of the local youth towards sustainable tourism in the GMS at Nakhon Phanom and Khammouan was revealed that the group of youth had been developed by plans of participating in five aspects of the development of sustainable tourism: the problem searching, the planning, the operation, the benefit and the evaluation. Secondly, the results from this study were taken and integrating into the project of creating a sustainable tourism in the GMS network of youth in Nakhon Phanom and Laos PDR. The purpose of this qualitative study was to investigate how to build a network of youth in order to increase their awareness of sustainable tourism in the GMS by using the action research with the application of A-I-C for participatory planning as a tool. Thirdly, this study also analyzes and synthesizes the results of the previous quantitative study along with findings from interview, group discussion and direct observation from qualitative study for searching a guideline of sustainable tourism by youth. The results from a model of the guideline in sustainable tourism by youth using the English letters form "TEAM" showed that participants have exchanged the knowledge and the operational experience from the sustainable tourism community which guided them to understand problems of tourism in the community. Participants have also participated in tourism plans, implemented in the sustainable tourism, received mutual benefits and evaluations in order to develop the community together effectively.

OP-134

**Developing Innovative Methods of Outdoor Ads with Interaction of Digital Arts \***

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Today, along with the "Neo-Liberal" globalization in the world economy markets, cities are beginning to gain identity and new textures. Throughout the world, especially the cultural, economic and social changes after 1980 have facilitated the transition to free market and implementation of the liberal policies in 1990's. These sort of liberal practices performed on behalf of globalization (hiving off, foreign expansion of freedom, etc.) in the last quarter of the twentieth century, have gained momentum with the beginning of the transition to digital life. Thus, the rapid development of information and communication technologies as a result of increased production, begins to create new marketing models for itself. The advertising agencies desiring to go different directions other than conventional methods, that had been constantly after new medias until the 1990s. The rediscovery of activities by Outdoor Advertising, provides opportunities to different marketing techniques supported by digital technology and those who want artistic applications to reach a wide audience. Art produced in an electronic environment that can be described briefly as 'Digital Art', with the format of multiple artistic or technical applications, in this new face of Outdoor Advertising has created itself important exhibition areas. When the digital designs, fed with images reflected from the city's cultural heritage, silhouette and citizens meets with the recipient is being absorbed more fruitfully. Especially in the 2000s, the system called 'Digital Outdoor Network' has been observed to have developed. The analysis of 'Next Generation Advertising' makes serious awareness and difference, over access in urban furniture and also individual social networks. In this context, this article will investigate the coexistence of the expression of digital art applications with the virtual or real public spaces in the sense of the new advertising based on bytes.

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OP-135

**Economic Development of Ski Industry in Experimental Innovation: Example of Palandoken Turkey and Alps Switzerland \***

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Sport contributions to people health, social development also it regulates social with unity and solidarity. All people around the World accepts existence of sport benefits. In this age, sport base on economy that is extends domestic and international tourism and one of the winter sport. In the World, most preferred winter sport is Ski. Palandöken is most suitable sport facility respecting to season conditions and facility sufficiency in our country. Alps is one of example in the World at Switzerland. Switzerland, hosts 30.000.000 Ski Lover which is that amount equal to 4 times Switzerland's population at Alps. That amount of tourist came to Turkey in 2012.

OP-136

**The Relationship Between Research & Development Expenditures and Economic Growth: The Case of Turkey \***

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This article examines the association between Research and Development (R&D) expenditures and economic growth at a national level in Turkey. Not only theoretical, but also empirical literatures have shown that investments in R&D are indispensable for economic growth. The relation between expenses on R&D and economic performance has attracted a lot of attention in the academic field. In addition to this the subject has long been emphasized by governments and enterprises. Most contemporary economists have attributed the sustained growth in developed nations to their intensive R&D activities. As a developing country, Turkey is the 17th largest economy in the World Bank GDP ranking. According to Turkey's 2023 Goals the country is aiming for ranking among the world's top ten economies. Thereby, examining the relationship between economic growth and R&D expenditures has a particular importance for Turkey's economic targets.

In this study, the relationship between R&D expenditures and economic growth was investigated for the period of 1990-2013 in Turkey. With this purpose, unit root tests, cointegration test and the Granger causality test were used. As a result of the analyses, it was determined that how the relationship R&D expenditures and economic growth are related to each other.

OP-137

**Export Performance of Central and Eastern European Countries. Macro and Micro Fundamentals \***

*Ana Maria Cazacu ( Bancu)*

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This paper analyses the evolution of exports' value and sophistication during 2004-2012, using Hausmann, Hwang & Rodrik (2007) methodology. Focusing on Central and Eastern Europe, it is underlined that these states have to intensify efforts to support innovation-led growth through higher investments into technology intensive and sophisticated sectors. Export performance indicators are heterogeneous across countries, but also within the same country. We use panel fixed-effects models in order to investigate regional disparities of external results at county level in the case of Romania. The empirical results show that counties' trade volumes and sophistication are explained by region specific factors (value added and foreign direct investment) and, more importantly, by micro-level behaviour. Based on Total Factor Productivity, computed by Wooldridge (2009) GMM method, we find that heterogeneity of firm-level technology and efficiency is the key for explaining the differences in aggregate trade outcomes. The performance of high percentiles firms drives external Results: more sophisticated and higher volumes of exports are recorded in regions where the productivity distributions have fatter right tails. This evidence brings into question the efficiency of policy measures targeting

external competitiveness, highlighting the importance of taking into account the entire firm-level performance distributions, rather than just the average.

**OP-138**

**Economic Complexity and Export Competitiveness: The Case of Turkey ❖**

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Economic complexity can be defined as the composition of a country's productive output and represents the structures that emerge to hold and combine knowledge. Increased economic complexity is required for a country to be able to hold and use a larger amount of productive knowledge and R&D. Concerning the product categories and their complexity, the most complex products consist of machinery, chemicals and metal products. However, the least complex products are largely raw materials, wood, textile and agricultural products. The main exporters of the most complex products are developed countries. This means that the countries have a high export competitiveness. On the other hand, the main exporters of the least complex products are underdeveloped and developing countries that have a low export competitiveness. Considering the share of high-tech exports, it is seemed that Turkey is below the level it should be. This causes relatively low index of economic complexity and low export competitiveness of Turkey.

**OP-139**

**Knowledge Spillovers, Absorptive Capacities and the Impact of FDI on Economic Growth: Empirical Evidence From Transition Economies ❖**

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In this paper, we use panel data analysis to investigate the impact of FDI and related knowledge spillovers on economic growth in transition economies. We contribute to recent literature in that we examine the links between absorptive capacity of a host economy, FDI and economic growth. We rely on a better quality of FDI data, and use a wide range of technology and innovation related proxies for absorptive capability, not previously studied. Precisely, we investigate the exogenous impact of government and business R&D expenditures, skills and productivity of workforce on economic growth. We further examine the degree of complementarity and interdependence between the individual proxies for absorptive capacity and FDI, the complex phenomena assumed to influence the extent to which FDI may be growth enhancing in transition economies. We find that FDI exhibit a positive (exogenous) and significant impact on economic growth in transition countries. However, the extent to which FDI contributes to economic growth is dependant on the specific absorptive capacity of the recipient economy. The strongest impression conveyed by this analysis is that technological capabilities of local firms and industries influence a host economy ability to absorb and internalise the knowledge associated with FDI. The results are robust to endogeneity issues.

**OP-140**

**The Influence of Green Trust, Green Self-Efficacy and Household Economy Towards Buying Green Behavior in Malaysia**

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As the continuous growth of global economy and fast pace technology changes, we are facing many issues on how to scale up the dissemination of environmental practices in Malaysia. In popular discourse, "green" idea provides the center of sustainability importance, environmental knowledge and environmental concern are taken as good factors to influence the buying green behavior. However in 2000s, the theories are weaken over years due to customer preferences, market and economic changes. Furthermore, environment concern

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and eco-literacy do not facilitated by the positive attitude, consequently, they are not willing to perform this green buying behavior because they do not believe in their effort or actions as an effective solution for environment issues. The realization of 'worth-to-buy green products' come about when green products solve the individual concerns which driven by needs and wants. In contrast, prior studies indicated that customers are willing to pay more in saving cost and energy products. The inconsistency of attitude-behavior occurred derived from the intention novel which is the central focus of Theory Planned Behavior. Hence, the study proposed an integration green drivers from Theory Planned Behavior and Black Box model, namely; green trust, green self-efficacy and household economy to examine the impact of internal and external factors stimulate positive relationship towards buying green behavior. Therefore, it is essential to investigate the green attitude-behavior gap and gain understanding on green buying behavior as to flourish green market strategy in Malaysia.

**OP-141**

**Building Knowledge- Based Entrepreneurship Ecosystems: Case of Iran ❖**

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The purpose of this paper is to identify and analyse the elements relations of the knowledge-based entrepreneurship ecosystem(KBEE). They are extracted through exploratory study of literature and interview with entrepreneurial experts in Iran; the paper utilizes the "interpretive structural modelling" (ISM) technique in order to model the building KBEE. A sufficient sample of entrepreneurial experts (15 people) in Iran was interviewed for this purpose. According to exploratory study of literature and interviews with experts, seventeen elements of KBEE are identified. Elements are divided into two groups: six actors and eleven factors. The actors of KBEE are academic entrepreneurs, entrepreneurial universities, science and technology parks, knowledge-based industrial parks, financial institutions and government. The factors of KBEE are entrepreneurship opportunity, entrepreneurial capacity, technological learning, entrepreneurial culture, innovation capital, human capital, social capital, knowledge production, infrastructure and info structure and university- company interactions. The analyses of elements relations in KBEE demonstrates that among the actors, scholars, researchers and scientists play entrepreneur role; entrepreneurial universities have incubator role; and government plays a supportive and key role in the KBEE. The key of building and lanching KBEE in Iran's provinces is in the government hands.

**OP-142**

**Eco-Innovation as Modern era Strategy of Companies in Developing Countries: Comparison Between Turkey and European Union ❖**

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Eco-innovation is developing new ideas, promoting new operations, products and processes to protect the environment, so obtaining environmental sustainability. Eco-innovation supports the survival of the companies as proposing an acceptable image for these companies to stakeholders. The innovation which decreases the environmental damages and hereby develops the sustainability of the firms, including eco-products, eco-processes and eco-organizational factors is called eco-innovation. Eco-innovation is one of the aims of EU, and establishes a part of the development and economic policies. Technological progress makes the companies benefit from eco-innovation. Besides the environmental benefits; there are also cost related gains for the companies which apply eco-innovation. Organizations take eco-innovative actions because of the governmental pressures, consumers' pleasures and the great risk of changing climate in all over the world. Climate change, ozone layer depletion, acidification, eutrophication, decreasing biodiversity and land degradation are some of the environmental threats that face the humanity and also the companies' survival. Hence multiple stakeholders of the societies expect the companies to be sensitive about eco-innovation to protect the

environment in order to save the nature and human lives. Eco-innovation is one of the leading strategies to promote resource and energy efficiency and create a low carbon society in EU; because this strategy has other advantages like decreasing the costs of material purchasing. So it leads EU to be more competitive in global world. Eco-innovation is simply contributing to the sustainable company survival by challenging the environmental issues in the eyes of multiple stakeholders in the society. In this study we have comparisons between Turkey and European Union in the framework of eco-innovative behaviours of the firms.

**OP-143**

**The Validity and Reliability of ISO Test Towards Future Physical Education Teachers Performance Assessment in Teaching and Learning Process ❖**

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Teacher performance assessment is a method that can determine the quality of the teaching and learning process. Therefore, a standardized teacher assessment instruments should be established to ensure a meaningful impact on the quality of the information delivery to the students. This study aims to assess the validity and reliability of ISO Test towards future physical education teachers performance assessment in teaching and learning process. The study includes three evaluation criterias, that are the input, strategies and outcomes during the teaching and learning process. ISO Test is constructed based on the daily teaching and learning lesson plans set by the Ministry of Education in Malaysia. The findings show that the validity of ISO Test is  $r = .82$ , while the reliability of ISO Test is  $r = .78$  ( $N = 36$ ). The percentage of agreement between examiners (interobserver agreement) of ISO Test is 70.11 % ( $SD = 0.57$ ). Based on these findings, ISO Test instrument is suitable to be used as a standard to evaluate the performance of future Physical Education teachers in the teaching and learning process.

**OP-144**

**The Usage of ‘Turnitin’ as an Innovative Educational Tool: Inculcating Critical Thinking in Integrating Naqli and Aqli for Subject of Malaysian Economy ❖**

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Convenience and ease of ICT’s usage in teaching and learning in higher education indeed facilitate and fascinate most of students in the modern world. Thus, this paper focused on the usage of the Turnitin software in the higher education learning (not only for the purpose of anti-plagiarism) but could be used as self-evaluation tool inculcating critical thinking in integrating the Naqli and Aqli in the subject of Malaysian Economy. 271 undergraduate students from the Faculty of Economic and Muamalat, Universiti Sains Islam Malaysia (USIM) taking subjects of Malaysian Economy were involved. A simple individual assignment was instructed early in the semester and were to upload their assignment through the turnitin system in the second week. All students are allowed to review their submission according to their performance in similarity percentage from turnitin system, and are to resubmit their assignment in the tenth week. This paper analyses the main sources, similarity percentage, surah selection and topic selection in each individual assignment. At the end of the study, it was found that turnitin systems help student in improving their skill in integrating the Naqli and Aqli reasoning for the subject of Malaysian Economy.

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**OP-145**

**Personalized Learning Environment: Alpha Testing, Beta Testing & User Acceptance Test ❖**

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With the evolution of computer technology, learning science can be improved with the help of multimedia tools in order to attract their attention and interest. Personalized Learning Environment for Nutrition (PLENut) is a multimedia prototype which is to increase student performance in learning Science subject using Personalized Learning Environment (PLE) approach. Unlike other form of conventional application which is using traditional methods, PLENut applied high quality, effective teaching and learning process. This paper reports the findings of Alpha, Beta Testing and User Acceptance Test. The results revealed the feedback from users about the development of prototype. In this study, the development process of the environment is examined according to the Analyze, Design, Development, Implementation, Evaluation (ADDIE) model. In order to evaluate the application, it goes through a series of testing which are Alpha Testing, Beta Testing and User Acceptance Test. The study also can provide useful information for improving the quality of the teaching and learning experiences using PLE approach.

**OP-146**

**Linguistic Change and Identity ❖**

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Language dynamics are related to an important set of factors – age, gender, history, geography – and as well to new means of communication used in daily life. With the extensive use of new technologies, and the implementation of the latest approaches dealing with learning and understanding, Information and Communication Technologies (ICTs), have become one of the necessities of modern learning and communication. Even in developing countries like Algeria, Tunisia, and Egypt, these technologies have overwhelmed schools, colleges and universities. The issues addressed in this paper concern primarily understanding lexical innovation in the speech of Algerian Oran teenagers spoken variety, and how the use of ICTs influence their understanding and learning. This will contribute to language innovation and change, semantically and pragmatically in use throughout social space, more specifically at the impact of ICTs usage and integrationist approaches to language in the current linguistic scene.

**OP-147**

**Determinants of International College Student’s Performance in Mathematics ❖**

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This research paper places an emphasis on the relationship between mathematical skills and the qualifications of international college students in Thailand whose mathematics related courses were taught in English. 428 international college students were used as samples representing the population of approximately 30,000 international college students in Thailand. This study tries to determine the qualifications which may affect the academic performance of students in math related courses. The study employed Log-linear multiple regression as a tool to represent this relationship. The results yielded from Covariance Analysis suggested that sciences/math subject area from high school interacts significantly with both student’s age and their English skills – negatively for age and positively for English skills. Moreover, the three nationalities of students – Thai, Chinese, and Vietnamese – interact significantly with student’s ages and moves in the same direction. Lastly, quadratic relationships were expressed on both students’ ages and their IQs, implying that as student’s ages and IQs increase, their academic performances in mathematics related courses increase with increasing rates.

OP-148

**Using Blogs in EFL Teaching - A Case Study of Macedonia \***

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Seeking to promote autonomy in language learning and the value of technological support in language acquisition, this paper reports initial results from a study into the effectiveness of computer-assisted second/foreign language instruction in an English Language Methodology course, conducted over two semesters over the years 2013/ 2014, at the department of English Language and Literature, at the Philological Faculty, State University of Tetovo, in the Former Yugoslav Republic of Macedonia (FYROM). Applying content analysis (Silverman, 2005) to identify themes biases and meaning, the study investigated the effect of Blogs in second language acquisition as well as students' attitudes towards Blogs. Convenience sampling among students enrolled in the course identified a non-random sample of 58 students representing 80% of the possible cohort. Initial quantitative analysis applying descriptive and inferential statistics (Fraenkel& Wallen, 2003) were applied to analyze the effect of the Blog on learning outcomes. Content analytical procedures were then applied to student interviews to confirm the descriptive and inferential statistics previously established.

OP-149

**Applying Minimum Quantity Lubrication (MQL) Method on Milling of Martensitic Stainless Steel by Using Nano MoS<sub>2</sub> Reinforced Vegetable Cutting Fluid \***

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Martensitic stainless steel materials have provided some benefits for aerospace, automotive, hydroelectric engines, cutlery, defense, power hand tools, pump parts, valve seats, chisels, bushings, ball bearings, sporting equipment industry, dental and surgical instruments etc. due to their hardness, strength, and wear resistance. Machining operations such as milling, turning, drilling can be applied to give them the final form. But, these kinds of steels are specified as hard-to-machine materials owing to their high strength, low thermal conductivity and work hardening tendency during machining operations. However, martensitic stainless steels can be machined by using cutting fluids which are environmentally hazardous, unhealthy, and costly. Therefore, in this study, minimum quantity lubrication (MQL) method was applied by using commercial vegetable cutting fluid and 1%wt. of nano MoS<sub>2</sub> powder reinforced vegetable cutting fluid during milling of AISI 420 martensitic stainless steel with uncoated Tungsten Carbide (WC) cutting tool and the sustainable milling operation was performed. The experiments were carried out at constant cutting speed, feed, and depth of cut and two different amounts of nanofluids – pressure air mist supplied by MQL system were applied as 20 ml/h and 40 ml/h. In the consequence of milling operations, tool wear and surface roughness were investigated.

OP-150

**Mechanical and Physical Properties of Injection Molded Halloysite Nanotubes-Thermoplastic Polyurethane Nanocomposites \***

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Due to high aspect ratio of nanoscale reinforcements will enhanced mechanical properties of pure polymer matrix. There are researchers reported mechanical properties of Halloysite Nanotubes (HNTs) nanocomposite formed through casting and compression molding. Less researchers reported formed through injection molding. Therefore, present work describes the preparation, characterization and processing of thermoplastic polyurethane (TPU) and Halloysite nanotubes (HNT) nanocomposites via injection molding. HNTs are functionalized for carboxylic

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groups through acid reflux. As produced and functionalized HNTs are mixed using brabender mixer with concentration range between 1 wt% to 7 wt% with variation mixing parameters (mixing speed, mixing time, and mixing temperature). Injection molding were used for formed tensile bar shaped with variation of molding parameters (injection temperature, injection time, and injection pressure). Mechanical properties was conducted using Instron Universal Tensile Tester. Significant increment of tensile strength found at 1.0wt.% HNTs loading concentration. The tensile strength of the HNT-TPU nanocomposite exhibited 24.3 MPa at 1.0wt% loading concentration which higher than pure TPU. The elongation at break of the HNT-TPU nanocomposite is 353.7 mm compare to original length. The Young's modulus of the TPU-HNT nanocomposite is 15.45 GPa at 7wt.%.

Physical properties were analysed using TGA, DSC, and SEM. SEM show HNTs well dispersed in TPU matrix. TGA and DSC results showed addition HNTs increased thermal properties. It can be concluded that HNT-TPU formed by injection molded have excellent mechanical and physical properties compared to pure TPU.

OP-151

**Incorporating Malaysian's Population Anthropometry Data in the Design of an Ergonomic Driver's Seat \***

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An ergonomically designed driver's seat is crucial in ensuring quality, comfort and safe driving. The increase in road accidents every year is mostly linked to drivers' fatigue. The aim of this study is to design a driver's seat which is suitable for Malaysians. The three main objectives in this study; firstly, to investigate the comfort level and safety system of the existing driver's seat, secondly, to identify and determine parameters which may affect comfort and the driver's seat safety system, and lastly, to develop and design an ergonomic driver's seat. Anthropometric data of drivers should be used during the driver's seat design stage. Critical dimensions of the driver's seat and anthropometric data must be taken into consideration in order to optimize the comfort level and safety of the seat. Previous studies showed that the evaluation of driver's seat discomfort should include both objective and subjective evaluations. The seat discomfort will negatively affect the driver's performance. In the data collection phase, the objective evaluation method was used in determining the seat's dimension while subjective evaluation was used to gather information on the drivers' experience. Anthropometric data from 1405 male and female subjects were collected and stored in a database. Meanwhile, subjective evaluation on driver's seat discomfort was conducted on 100 male and female respondents. The SPSS software was used to analyze the data. Every parameter that affects the safety and comfort of the driver's seat were then used to design a new driver's seat. The parameters that were taken into account are backrest height, cushion width, cushion length and adjustability. These parameters were then matched with the Malaysian drivers' anthropometric data. Finally, the dimensions of the new driver's seat were determined: 520mm cushion width; 380mm cushion length, 480mm backrest width, 407.5mm backrest height and 180mm adjustability.

OP-152

**New Revolutionary Ideas of Material Processing - A Path to Biomaterial Fabrication by Rapid Prototyping \***

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The fundamentally different features of Rapid prototyping (RP) from that of conventional sintering offer us some new approaches to develop materials with excellent properties. Applying this method, porous Hydroxyapatite (Hap) ceramics, as well as the HAp-zirconia composites have been fabricated successfully.

Porous hydroxyapatite (Hap) is expected to have desired mechanical and biological properties for biomedical applications. However, due to material processing problems, to date, this material can only be prepared by conventional techniques. Fuse deposition Machine is modified to fabricate Hap conventional support structure is not required three nozzle system is utilized for fabrication. Main nozzle is provided with heating arrangement. Two nozzles provided for transient Hap and solvent.

Three stages heating with two lasers arrangement for gradual temperature change so transformation is faster. Primary result shows mechanical properties and porosity is as per bone structure. The micro structural characterizations such as phase purity and composition of porous BCP granules were performed and verified by X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FT-IR) analysis. The chemical and the microstructure information of the Fabricated Hap were investigated by FT-IR (Fourier Transform Infra-Red), SEM (Scanning Electron Microscopy), X-ray Diffraction (XRD).

Result shows interconnected regular pores and uniformly distribution of Hap. There is covalent bonding makes stronger adhesion to prosthetic. Using this technique, it is possible to produce scaffolds with mechanical and structural properties close to those of the natural bone and teeth. The prepared scaffold has an open, regular pattern and uniformly interconnected porous structure. Some extent problem of small Nano particle aggregate together is called Balling and product of different temperature solidify on the layer is called recasting is dominates the process. By optimizing the operating parameter these problem can be minimized.

**OP-153**

**Influence of Natural Rubber on Creep Behavior of Bituminous Concrete \***

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The aim of this experimental work is to show the possibility of improvement of bituminous binders by natural crumb rubber. In this study, we propose the modification of a 35/50 bitumen by natural crumb rubber (NR) at the different contents (2%, 4%, 5%, 6% and 8%). The powder rubber used for the manufacture of rubber asphalt binder has been provided by the Algerian company SEAL "Application of Elastomers Corporation". The influence of natural crumb rubber (NR) on the creep behavior of bituminous concrete was studied. The results show an improvement on the creep behavior of the different mixtures considered in this work.

**OP-154**

**Integrated System for Detection of Dangerous Materials and Illicit Objects in Cargoes \***

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Terrorist attacks have nowadays become a serious threat, and this threat only continues to grow. The objects of transport infrastructure are among the primary targets for such attacks.

We review the existing means of detecting the transportation of dangerous materials and illicit objects and show that no systems are available that completely meet the requirements of homeland security and are simultaneously cost-efficient for cargo inspection. The current equipment is either both bulky and very expensive, does not provide completely reliable inspection results, or demands a time-consuming inspection procedure requiring several types of scanner (which is unacceptable given the huge and permanently increasing volume of transported cargo). We compare various techniques of detecting the transportation of dangerous materials and illicit objects, discuss how they correspond to the current needs, and propose a possible solution to the existing serious problems. As the next step towards the reliable detection of dangerous materials in large cargoes we propose development of an integrated system that combines the best features of the most developed technologies; namely, X-ray analysis (providing the high-speed monitoring and identification of suspicious objects and areas)

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and neutron analysis (providing high selectivity and precise identification).

Such a layered approach would allow the avoidance of the unnecessary scanning of all objects in the active interrogation mode, thus reducing the inspection time. Moreover, it makes it possible to clarify all suspicious areas in the container via a single system inspection.

RatecLab Ltd develops universal detection system of high resolution gamma spectroscopy for tagged neutron analysis with time-of-light filtering (Skolkovo Grant 2014-2015). Neutron analysis system equipped with our high resolution spectroscopy platform will give most reliable answer on dangerous substance detection in large dimensions cargo. We demonstrate some characteristics of the developed platform.

**OP-155**

**Improving of Sewability Properties of Various Knitted Fabrics with the Softeners \***

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From children up to the elder everyone needs to feel the softness of the fabric in the first moment of dress up. Various consumers consider fabric handle as one of the most important attribute in their purchase of apparel products, therefore companies tend to focus on these demands nowadays. Knitted fabrics meet some of handling demands of customer but for a complete solution finishing is the most important step for meeting them (Tondl, 2006; Sand et.al, 2006; El-Dessouki, 2015). Sewing damage during sewing is one of the most troublesome problems in the clothing industry. For the knitted fabrics, this problem is acute due to the fact that they are prone to damage during sewing, wearing or laundering. (Fan, 1997). Sewability is the ability of fabric to be sewn without holes and drapes. This property is attributed to fabric properties, pretreatment, finishing, sewing conditions and mishandling (Grancaric et.al, 2005). The aim of this study is; to research the effect of the parameters, such as knitting structure, softeners type and chemical concentration to the sewability and seam puckering in apparel on cotton knitted fabrics. For this purpose, the five various softeners with two concentration were applied to the pre-treated 100 % of cotton single jersey, interlock and fleece fabrics. After applications, the sewability and the seam puckering of all fabrics were measured and the obtain results were statistically evaluated. As a result; the lowest results of needle penetration force, which is the indication of the sewability, have been obtained with single jersey fabric, wale direction of the fabrics and in treated fabric with macro silicone softener. Seam puckering feature has improved with fleece fabric, cationic and nano silicon softeners at high concentration.

**OP-156**

**Direct vs. Anonymous Feedback: Teacher Behavior in Higher Education, with Focus on Technology Advances \***

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The paper aims at analyzing how feedback and valuations from students impact on the behaviour of the teacher. It offers a broad view on the effectiveness of feedback, based on the direct experience of the author, and the discussions and interviews held in the previous years with other faculties. What follows is an in depth analysis of the students reaction to various learning approaches and how their opinion and feedback are formed. The behaviour of teachers is then described, according to the actual feedback received by the students, especially relating to how the form of feedback influences the will of the instructor to accept and implement it. A description of the role of technology is taken into account then, with in depth analysis of the impact of such a methodology on the general behaviour of the teacher. Last core section reports the results of an interview with students of English language at Higher education institution. The conclusion is that higher education is characterized by high sensitivity on both sides. Students can reveal strong and even harsh opinions, which are usually followed by well determined reactions by the teacher in terms of the adjustments made to the course structure and teaching material.

OP-157

**Evaluation of the Mechatronics Curriculum Using Model Stufflebeam (CIPP) \***

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Assessment means a study that has been established and implemented to help the observer to assess the value and merit of an object. This assessment can be performed on any activities that have the aim. CIPP evaluation model was chosen because of its effectiveness to get results of formative and summative and to find the decision, and problem solving ability. This study is to know the definite stage dimensional context, input, process and product in Mechatronics curriculum implementation. The method used is the analysis of documents, with reference to previous studies. The results of this study, the researchers identified the aspects of the study based on the dimensions of context, input, process and product in Mechatronics curriculum implementation program. In fact, this aspect of the study identified can be used to assess the Mechatronics program in terms of overall performance and significant.

OP-158

**The Relationship of the Creativity of Public and Private School Teachers to Their Intrinsic Motivation and the School Climate for Innovation \***

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The climate for innovation is related with organizational outputs comprising the benefits of ideas, significant innovations and satisfaction of the employees and the service takers; and sophisticated applications of the effectiveness of the services as perceived by service takers. It indicates an organizational willingness necessary for experiencing innovative ideas. As for intrinsic motivation, it can be defined as the experience of one's exposing his/her own talents or abilities. Internally motivated people have the ability of multi faceted reasoning and using various learning strategies. Then internally motivated individuals are expected to be more creative and make innovative efforts to support organizational goals. The purpose of this study is to discover the relationship of the creativity levels of the teachers to their intrinsic motivation levels and climates of schools for innovation. The study is designed in descriptive survey research. 13-item "creativity scale" developed by Zhou ve George (2001), 22-item "climate for innovation scale" developed by Scott ve Bruce (1994) and 9-item "intrinsic motivation scale" adapted from the work of Mottaz (1985) by Dündar et al (1994) will be used in the study. The data will be collected from pre-school, primary, secondary and high school teachers working at public and private schools in Ankara Province during 2014-2015 education year. In the analysis dimension of the study, mean and standart deviation, t-test, ANOVA, Pearson Product Moment Correlation and Multiple Regression Analysis will be conducted.

OP-159

**The Academicians' Perspective on the Challenges Facing Higher Education in Turkey \***

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One would agree that higher education institutions are the place where knowledge is created and acquired. However, the higher education institutions struggling with various structural, organizational, and personnel challenges may not be able to place their focus on creating knowledge. Hence, they should be provided with all the resources they need, and the challenges they face should

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be addressed in a professional manner.

This study explores numerous challenges facing higher education in Turkey. While several studies done in the past highlight a number of challenges Turkish universities experience, those challenges were often not articulated well. In this study, we made an attempt to provide a framework for understanding the major problems and challenges higher education institutions in Turkey have been struggling with. Some of the challenges discussed in this study are rooted in the perception and assumption that higher education institutions are a gateway to the job market. Although this perception is partially true, the real purpose of higher education is to provide the students with various critical thinking skills so that they can make informative decisions and address the challenges they may encounter once they graduate. In this research, the key issues associated with challenges Turkish higher education institutions are struggling with are investigated and presented using academic research and a literature meta-analysis.

OP-160

**Perception of Students Towards Lecturers Teaching Engineering Courses with Industry Experience: A Case Study in Malaysia Technical Universities \***

*Kartina Johan*  
 Kartina Johan

Teaching effectively engineering lessons in class requires a good teaching skill but preparing the undergraduates especially the graduating students with employability skills is indeed a challenging task. In the context of Malaysia Technical University Network (MTUN), the graduating engineering students are expected to be good both in academics and the soft skills in particular of being ready to work as engineers. This is in line with the National Graduate Employability Blueprint 2012-2017 published by the Ministry of Higher Education Malaysia. One of the approaches of getting the knowledge of being an engineer is to learn and experience it from the engineers themselves. It is an advantage for students if the lecturer is an engineer himself preferably with a long attachment in the industry. However such experiential learning is feasible if the university lecturers have exposure to industrial experience as engineers and the students have certain level of fundamental knowledge to maximize the learning process. This paper aims to study the perception of the students to the lecturers with such engineering experience towards their learning experience. The study will adopt the quantitative research methodology. A structure survey instrument will be developed to study the students' perception on the lecturers. The targeted respondents are among the engineering students in the major technical universities in Malaysia. The results are expected to show the difference between the perceptions of students on their learning experience from the lecturers and their readiness in learning from them based on their knowledge in fundamental courses. The findings may support the strategy of technical universities which are highly required to hire lecturers with industrial experience

OP-161

**MALL Revisited: Current Trends and Pedagogical Implications \***

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A need for the review of Mobile-Assisted Language Learning emerges to shed light on the future research to prepare, plan, design and integrate a mobile learning based pedagogical framework. This study aims to provide a general but recent outline of the research focusing on MALL with references to national (Başoğlu & Akdemir, 2010; Öz, 2014) and international studies (Liu & Chen, 2014; Hsu, Hwang & Chang, 2013). With the qualitative meta-analysis design, this study examines 32 selected MALL papers published between 2010 and 2015. Database and citation search were performed limiting the keywords to MALL, while excluding the studies on m-learning. In addition to the existing meta-analyses on MALL (Burston, 2014; Duman, Orhon & Gedik, 2014), as a follow-up, the findings reveal a skill-based language learning orientation with an emphasis on vocabulary and listening, followed by learning factors such as student perspectives, motivation, intention, acceptance and readiness to use new mobile technologies. New additions to MALL research include but not limited to integration of social media, a link to language acquisition and more focus on design of applications.

OP-162

**Entrepreneurial Mindsets for Innovative Brand Development: Case Studies in Jewelry Education \***

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Since 1992, there has been development of a triple helix of university-industry-government in the jewelry industry to produce middle management for original equipment manufacturing (OEM), which is mostly typical in Thai industry. To promote the export market, jewelry manufacturers needed to develop added-value products along the lines of an original brand manufacturing (OBM) model. Thai government policy has been to promote research and innovation in universities for transfer to industry and subsequent development of innovative products and brand image. Hence, new materials and innovative technologies needed to be delivered to the Thai jewelry industry. However, there were struggles with OEM to develop a brand image among the mindsets of workers. Therefore, the innovation-branding development concept was introduced in small- to medium-sized enterprises. University business incubators were introduced as a scientific classroom-based activity of material science program focusing on gems and jewelry to develop interpersonal skills and entrepreneurial mindsets. This paper reports on the development of entrepreneurial mindsets in this environment and the diffusion of marketing and technological concepts in the industry. A dummy company was established, and it selected innovations from universities for students to role-play brand manufacturers, selling products in international trading fairs. These activities began in 2009 and the careers of the key persons involved have been followed. Data was collected on the success of their careers as entrepreneurs after graduation. The results show that they are eager and persistent to do the business and develop their own brand right after graduation. Some characteristics such as engagement, social responsibilities, participative behaviour and honesty in business were displayed.

OP-163

**The Example-Problem-Based Learning Model: Applying Cognitive Load Theory \***

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Cognitive Load Theory (CLT) suggests that learning takes place best in a situation that equivalent to individual cognitive design. Thus, this article proposes a learning model called Example-Problem-Based Learning (EPBL) which a combination of two learning strategies: worked-examples and problem-solving. This teaching method guides students to go through several cognitive development. At the early stages of knowledge acquisition, novice students benefit more from worked-examples, which is a model of problem-solving. After they have gained sufficient knowledge, worked-examples may no longer be appropriate because the positive effects of worked-examples will be lost. Therefore, learning through problem-solving should be applied since students have already equipped with profound domain knowledge. Established in an experiment conducted, the EPBL teaching method enhances students' knowledge acquisitions, learning transfer, and mental effort during learning; as well as increasing the learning efficiency.

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OP-164

**Managing Diversity in Higher Education: USAFA Case \***

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Today organizations are heavily affected by globalization and changes in the demographic structure of the society. Since the sex, race, and ethnic diversity of organizations is much broader than the past, nowadays the number of members in the same organization sharing different backgrounds and values has been increased to a great extent. On the other hand the rapid development in technology not only entails more trained and skilled workforce but also necessitates sharpening intercultural collaboration skills in the organization. Organizations managing effectively a diverse workforce are capable of increasing organizational innovation and creativity, reaching more people and customers. Thus those organizations embracing diversity acquire competitive advantage and increase profitability. Educational institutions with a focus on diversity can graduate well trained employees capable of managing diversity and resolving diversity related workplace conflicts. Therefore as the organizations' need increase in managing diversity, higher education institutions graduating labor force with intercultural communication skills and employees well aware of cultural diversity become more and more important in improving organizational effectiveness. United States Air Force Academy (USAFA), one of the world's largest military academies, sets a model in managing diversity with its policies and practices related to coping with diversity effectively. USAFA curriculum is tailored in accordance with the great number of cadets -approximately 4000- varying in ability, interests and character. With its prep school USAFA supports cadet candidates from disadvantaged sections of society by providing them with a one-year program enhancing their readiness for USAFA and helping them to maximize their full potential. Furthermore USAFA via various innovative techniques helps all cadets participate in learning and teaching activities. The focal point of this study will be USAFA and the study will elaborate on innovative USAFA policies regarding the diversity management in a higher education institution.

OP-165

**Assessment of TEOG (Transition From Basic to Secondary Education) Examination Success: Topsis Multi-Criteria Decision-Making Method Practice \***

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Turkey held various examinations with different names under the name of system of transition to secondary education in the last 30 years. However, each examination method was found inadequate and Turkish education system could not reach the desired success in PISA examination in which student levels of countries that are members of OECD are assessed. For this reason, it was embarked on new quests. TEOG examination was prepared according to semester curriculum, unlike antecedents which are consisted of single day and sessions. Thus, subjective error was minimized in the assessment by reducing the negative effect of the anxiety level factor in assessment of the student. Also, influence degree of school success points was increased. Hence, creation of a process-oriented education model was targeted not result-oriented. In this study; it was started to be searched whether TEOG examination is different from Institutions' Examination, LGS, OKS, SBS, OGES examinations used in transition to the secondary education in the previous years or not. The essential point in the research is to present success performances of schools. As measurement means, TOPSIS which is Multi-Criteria Decision-Making Technique (MCDM) was used and course were weighted by this method. 6 courses taught in pilot schools within the scope of TEOG central examination were selected. Success averages of courses selected were weighted and pointed with TOPSIS method. Points were mixed and a ranking was formed. Significant differences were found between the ranking obtained as a result of the study and ranking published by Ministry of National Education. While there is no change in lower and upper ranks in the both rankings, great ranking differences were found in mid-ranks.

OP-166

**“Ambiguity in English and Albanian Sentences” ❄**

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The concept of ambiguity as a semantic complex category is very little dealt in English language and almost none in Albanian language even though its importance is increasing every day in Modern Linguistics. This was one of the reasons that made us convey a comparative and contrastive semantic analysis on the concept of ambiguity in Albanian language and observe it in through the prism of English language. We hope that with this research we will help Albanian students understand better the process of translating ambiguous sentences from Albanian to English language. Our corpus is consisted of translation paradigms (Levenston, 1965) of ambiguous sentences that are identified and observed in Albanian language and how are they translated in English language. The main task of this research is to find out do ambiguous sentences continue to be ambiguous after translation process or they are disambiguated by the translators and what helps this process. Except the main question we will try to find out similarities and differences regarding the concept of definition and classification of ambiguity in English and Albanian language. The methods used in this research are descriptive (we have tried to describe in details the phenomena of metaphors in English and Albanian language), modelling method (with this method we have tried to link theoretical issues with practical examples, ambiguous sentences taken from translated books from Albanian to English language), comparative method (the phenomena of ambiguity in sentences is compared and contrasted in order to find similarities and differences concerning the concept and classification of ambiguity in Albanian and English language) and analytical method (we will try to give suggestions regarding the problems that came up during our analysis).

OP-167

**Linking Transformational Leadership to Work Engagement and the Mediator Effect of Job Autonomy: A Study in a Turkish Private Non-Profit University ❄**

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The concept of transformational leadership was introduced by the political scientist J. MacGregor Burns (1978). Within this conceptual framework, a transformational leader motivates his/her followers by promoting their high ideals and goals, and makes them achieve more than expected through inspiration. A transformational leader delegates tasks and allows followers to improve themselves in task-related decision-making through gaining personal experience. In this sense, job autonomy refers to employees' freedom and independence in decision-making. It is indispensable for an inspiring, supportive and motivating leader to increase work engagement of his/her subordinates (Avery, McKay and Wilson, 2007). Work engagement is a “positive, fulfilling, work-related state of mind” that is characterized by dedication, absorption and vigor (Macey et al., 2009). This concept involves some intrinsic motivations such as job satisfaction, pride, inspiration, working with high energy and focusing on work (Turgut, 2011). In their studies, Zhu, Avolio and Walumbwa (2009) identified the positive effect of transformational leadership – considering the personal traits of subordinates such as initiatives, analytical thinking and moral values – on work engagement. The studies by Tims, Bakker and Xanthopoulou (2011) also demonstrated that a transformational leader increases the work engagement of subordinates. This study examines the effect of transformational leadership on work engagement of academicians through job autonomy. Structural equation modeling as a quantitative research method was used and the data was collected using questionnaires. For data collection, Bass and Avolio's (1990) 'Multifactor Leadership Questionnaire', which examines transformational leader through the dimensions of idealized influence (charisma), intellectual stimulation, inspirational motivation and individualized consideration, was used. Work engagement was measured using Utrecht Work Engagement Scale (UWES) developed by Schaufeli and Bakker (2003) which has three dimensions of vigor, dedication and absorption. The scale by Ilardi et al. (1993) was used to measure job autonomy. The data obtained by this study, which includes the academicians working in a private non-profit university, was analyzed using LISREL. Results showed that job autonomy fully mediated the effect of transformational leadership on work engagement.

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OP-168

**Application of Neutron Activation Analysis for Heavy Oil Production Control ❄**

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Monitoring of the process of oil production is essential for oil production control and optimization. About 70% of oil resource in a world is heavy oil. Largest of oil reserves located in Venezuela, Canada, Russia, Kuwait, Saudi, Mexico, China, Indonesia, Iran, Iraq, USA consist from heavy oil, extra heavy oil and bitumen.

It is still a challenge to find adequate and fair technology for heavy oil metering and control. The large number of multiphase flowmeters is defined for use in oil wells with viscosity much lower than 500cP, while metering the Heavy Oil, Extra Heavy Oil, or bitumen in Hot Production brings lots of problems that conventional methods couldn't resolve.

Ideal measurement technology for heavy oil production control must works at wide range of temperature, in low pressure environment, ensures accurate metering fluids of high viscosity, with high water-cuts, be resistant to erosion, plugging, unaffected by entrained gas or solid particles, has low sensitivity to changes in emulsion characteristics and velocity profile changes. The best solution will be if measurement can be made inline, right on site provides measurement in a real time.

We propose development of the multiphase flow meter based on the neutron activation analysis as the possible answer to heavy oil production control challenges.

Preliminary investigations show that with careful adaptation of various neutron activation analysis techniques, measurements of the ratio of sulfur and chlorine, concentration and speed of oxygen, and other elements in flow will give precise information about water-cut level, oil/water/gas content, water fraction velocity and other characteristics crucial for well production process.

OP-169

**Suitability of Biochar Produced from Biomass Waste as Soil Amendment ❄**

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Conversion of biomass waste to a useful product has been extensively studied to compensate its abundance in quantity and combat current environmental issues especially greenhouse gas emission. Of the biomass listed comes from agriculture industry; empty fruit bunch (EFB). This study was conducted to investigate the suitability of this waste as soil amendment in improving soil quality. The waste is converted to biochar by mean use of pyrolysis technique. Pyrolysis temperature was varied to 400°C, 500°C and 600°C and the physiochemical properties were analyzed. The results obtained from this study indicate that as the pyrolysis temperature increases, the BET surface area of pores available on EFB biochar decreases. Besides, only small amount of biochar can be produced at high pyrolysis temperature. Several bands or peak diminished from the FTIR spectra of EFB biochar as the temperature rises. From the result also, it was observed biochar that was produced at 400°C pose a characteristic of high yield (50.60%), high fixed carbon content (31.89%) and with suitable morphological features such as high pore volume with better surface area which is important for carbon sequestration. At higher pyrolysis temperature, the crystalline structure of the biochar gradually decreases due to the lower in peak value of cellulose and lignin wavelength in XRD analysis. Besides, it is very alkaline (pH 10.88) which is suitable in neutralizing soil acidity and it contains high CEC value (35 meq/100g) which is believed suitable to increase soil fertility.



OP-170

**Acidogenesis of Palm Oil Mill Effluent to Produce Biogas: Effect of Hydraulic Retention Time and pH \***

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Acidogenesis of palm oil mill effluent to produce biogas was conducted based on an anaerobic digestion process. This process consisted of four different stages using various types of microorganisms which came from various groups of bacteria. This research studied the effect of hydraulic retention time (HRT) and pH to the change of the organic compounds concentration and solids content of POME to the growth of microorganisms during acidogenesis stage. Initially, the suitable loading up was determined by varying the HRT 6.7; 5.0; and 4.0 days in the continuous stirred tank reactor (CSTR) with mixing rate 50 rpm, pH  $6.0 \pm 0.2$ , and room temperature. Next, suitable pH was determined by varying the pH at 5.0; 5.5; and 6.0 with mixing rate 100-110 rpm and temperature 55°C. Analysis of TS, VS, TSS, VSS, COD, and VFA were conducted in order to study the growth of microorganisms and their abilities in converting organic compound to produce VFA. The highest growth of microorganisms was achieved at HRT 4.0 day with microorganism concentration was 20.62 mg VSS/L and COD reduction was 15.7%. The highest production of total VFA achieved was 5622.72 mg/L at pH 6.0, with the concentration of acetic acid, propionic acid and butyric acid were 2257.34; 975.49; and 2389.90 mg/L, respectively. While degradation VS and COD were 11 and 23%, respectively.

OP-171

**Enhancement of Eco-Efficiency Through Life Cycle Assessment in Crumb Rubber Processing \***

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Indonesia is the second largest country that produce natural rubber in the world after Thailand. The present practice in crumb rubber factories uses large volume of water and energy needs to be more efficient in their materials and energy usage and leads to environmental problems. The rubber industry needs to improve its competitiveness not only to increase profits but to ensure sustainability. Life Cycle Assessment (LCA) and Eco-Efficiency are used as the combined approach in this research to attain that objective. The study was conducted on two selected crumb rubber processing plants, Factory A and Factory B, in North Sumatera, Indonesia. The main objectives of the study are to conduct life cycle inventory for crumb rubber processing, analyze the environment impact from the life cycle processing activities, implement opportunities towards environmental improvements through LCA and also to suggest improvements of the impacts from the current practices of crumb rubber processing towards eco-efficiency. This study is a gate to gate study where data inventory starts from acceptance of cup lump from plantation and skim latex as a by product of latex concentrate processing. Based on the results obtained, Factory A contributed higher environmental impact than Factory B. Damage to resources is very high, dominantly contributed from fossil fuel. The highest impact in crumb rubber processing for Factory A is caused by formic acid (46.5%) and plastic (40.5%) with a total impact of 5.483 Pt, while for Factory B it is caused by plastic (64.5%), sulfuric acid (27.6%) with a total impact of 3.439 Pt. Factory B is found to be more eco-efficient in water consumption. As for energy intensity, Factory A has greater energy intensity compared to Factory B.

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OP-172

**Enzymatic Transesterification of DPO to Produce Biodiesel by Using Lipozyme RM IM in Ionic Liquid System \***

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Enzymatic transesterification reaction of degummed palm oil (DPO) in ionic liquid system has been demonstrated in producing biodiesel. Ionic liquid as a supporter of enzyme create a catalytic system that can be used in the transesterification of oil into biodiesel. Recycled Lipozyme RM IM to produced biodiesel from DPO as feedstock in ionic liquid system has been investigated. In this research, synthesis of biodiesel from DPO through transesterification (using of methanol as acyl acceptor) and recycled Lipozyme RM IM as catalysts in ionic liquid [BMIM][PF6] system is conducted in a batch reactor to obtain biodiesel as product were analyzed using Gas Chromatography (GC). As a study in this research, discussed the influence of ionic liquids to performance of Lipozyme RM IM or decreasing of lipase activity while recycled that seen from the acquisition yield of biodiesel as a result. The best result in ionic liquid system with ratio of DPO to ionic liquid 1: 1.5 (molar ratio) showed that decreasing lipase activity obtained in this research was about 4.28% (yield from 68.98% to 56.12%) after 4 times with the conditions of 1:3 molar ratio, temperature of reaction 45 °C and amount of Lipozyme RM IM was 30%, and 6 hours reaction time.

OP-173

**An Experimental Study About Determination of Transesterification Reaction Parameters Giving the Lowest Viscosity Waste Cooking Oil Biodiesel \***

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This study aims determination of transesterification reaction parameters to produce the lowest kinematic viscosity waste cooking oil biodiesel by using sodium hydroxide (NaOH) as catalyst and ethanol (C<sub>2</sub>H<sub>5</sub>OH) as alcohol. For this purpose, the individual effects of main reaction parameters such as catalyst concentration (0.50-1.75%), reaction temperature (60-90 °C), reaction time (60-150 min.) and alcohol/oil molar ratio (6:1-15:1) on the kinematic viscosities of produced biodiesels were investigated, respectively. According to results, reaction parameters giving the lowest kinematic viscosity of 4.387 cSt were determined as 1.25% catalyst concentration, 70 °C reaction temperature, 120 minutes reaction time and 12:1 alcohol/oil molar ratio.

OP-174

**The Characteristics of Urban Heat Island in Bangkok Metropolitan Area, Thailand \***

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Bangkok city is expanding its borders and population due to increased industrialization and urbanization. These can lead to increase in temperature in urban area and create an urban heat island which can affect human comfort, air pollution concentration, and lead to higher energy consumption for air conditioning. This study focuses on the urban heat island (UHI) development and its impact on building cooling load. It describes the climatology of urban heat island of Bangkok city using two common Methods: ambient air and surface temperature. Hourly air temperature data from four weather stations -one in rural site and three in urban sites for the last five year were used to study the characteristics and intensities of UHI in Bangkok area. The results by both methods indicate the presence of urban heat island in Bangkok. The study reveals that the nocturnal heat island is the most prevailing case which can be observed throughout the year. The maximum intensity of around 6-7°C

is detected during clear and clam night in dry season. The mean annual air temperature in Bangkok city is higher by 0.8°C than outside the city. The weather conditions (wind, cloud, and precipitation), and different land cover types are the major factors governing the near surface urban heat island.

## OP-175

### Tourists' Approach to Local Food ✱

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Tourism is a growing international activity with economic, social and ecological outcomes. Although there are various studies that explore tourist behavior in certain settings such as travel and accommodation, the impact of local food on tourist experience is often neglected. Eating is a physical need as well as a cultural and social activity. When tourists eat at a destination they not only satisfy their hunger but also experience the local culture and interact with their hosts. Tourists' demand for local food occur however in different levels of intensity. Some tourists travel solely for gastronomy in the region, some see local food as a by-product of their cultural experiences, and some others rather familiar food when they travel. Therefore there are differences in how tourists' approach local food consumption. This study aims to analyze the factors effecting local food demand in tourism in order to identify which tourists are interested in local food as an attraction. A questionnaire has been conducted on 105 tourists in order to reveal differences in motivational, demographic and psychological factors based on their local food experiences at various locations in the Old City district of Istanbul. Based on the analysis of data (one way and two way anova) significant differences were found between various demographic and tripographic factors on tourists' perceptions of local food. The findings of the study can be used on product design and marketing communications of restaurants and destinations with significant tourist flow in order to target the right audience.

## OP-176

### Research About Molecular Cuisine Application as an Innovation Example in Istanbul Restaurants ✱

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Restaurants should meet the desires and needs of its customers in the best way. They can compete with other restaurants and play a role in the forefront in this competition by innovating and submitting the current products with different tastes or services. Applications of molecular cuisine at this point, plays an important tool in this process by new preparation, cooking and presentation methods.

The aim of this work was to carry out to the potential contribution to the movement of molecular cuisine of the tourism industry. The responses given by professionals working in restaurants, where use molecular cuisine, and customers thoughts about molecular cuisine applications and their adoption status of molecular cuisine. The results obtained from 2 to 13 February 2015 in Istanbul. Data collected from semi -structured interviews. The results show that, the application of molecular cuisine, make a significant contribution to the development of Turkish restaurants and also welcomed by the customers.

## OP-177

### Tourist Perceptions of Cultural Identity: The Case of the Thai Experience ✱

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Tourism is seen as one of the main drivers of socio-economic progress in both developed and developing regions. Many developing countries perceive tourism as a fast track to economic growth. Thailand tourism's industry contributes significantly to the Thai economy, which receives around 7% of its GDP from international tourism revenue. Thailand is often viewed as a wondrous kingdom, featuring temples, wildlife and tropical islands. Visitors are also attracted by its history, culture, modern capital city and reputation as the "land of smiles". Entrepreneurs in Thailand try to capitalize on these characteristics to create products or services to serve tourists. However, good design and good quality are not enough to survive in a competitive market.

The make up of customers is constantly evolving and they are becoming more discerning and demanding. Thus, it is important to work closely with customers to make sure that products and services fulfill their needs and requirements, and to understand customers through study of their behaviors and preferences. This study explored customer perceptions of Thai cultural identity, and employed an emotional design approach to find out how products may fulfill customer perceptions and requirements. Data was collected by means of a questionnaire then statistically analyzed using the principal component analysis (PCA) approach. Results illustrate the relationship between customer perception and Thai cultural identity, and can be used to guide entrepreneur decision making to create new products or services following the Thai cultural identity and meeting of perceptions of customers.

## OP-178

### Rogers Theory on Diffusion of Innovation - The Most Appropriate Theoretical Model in the Study of Factors Influencing the Integration of Sustainability in Tourism Businesses ✱

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Sustainable tourism development is now a necessity of time. All the parties involved in tourism should participate in efforts to sustainable tourism development. Sustainability, as the best way of doing business today, is a new concept in the tourism sector and sustainable tourism practices can be considered as a new type of innovation in the tourism industry. Therefore knowledge of the factors affecting tourism businesses to integrate sustainability in their activities is critical. Without this type of information, we are limited in our ability to design tools that work in the future to mitigate barriers and increase motivations tourism businesses to adopt sustainable tourism practices in their activity. Factors' influencing in the integration of sustainable practices into business activities is very subject discussed in different industries and different scientific disciplines after the late 80's. However, a limited number of studies addressed perspective of tourism businesses to adopt sustainable tourism practices. These studies have used different theoretical models. This paper undertakes the analysis of these models from the review of literatures, giving their advantages and limitations in the study of the factors influencing businesses to adopt sustainable tourism practices. After analysis, the paper finally concludes that Rogers theory on adaptation and diffusion of innovation is a suitable theoretical model in the study of the factors influencing the adoption of sustainable tourism practices in tourism businesses.

OP-179

**The Intersection of Entrepreneurship and Strategic Management: Strategic Entrepreneurship \***

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Strategic entrepreneurship depends on integrating strategic management and entrepreneurship. Strategic entrepreneurship is a new approach in management literature. Furthermore, today's business world requires strategically oriented entrepreneurship. Also, strategic entrepreneurship is a necessity for firms to create the maximum wealth.

In this study strategic entrepreneurship which is the intersection of entrepreneurship and strategic management is examined.

OP-180

**The Investigation of the Effects of Plasma Treatment on the Dyeing Properties of Polyester/Viscose Nonwoven Fabrics \***

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In this study, Polyester/Viscose (PET/CV) nonwoven fabrics were treated with oxygen and nitrogen plasma application. The plasma application was carried out for 10 minutes at low and radio frequency. After then, the samples were dyed with disperse dyes at different methods which were high temperature, with carriers and without carriers. Finally, the effects of plasma treatment on dyeing properties of PET/CV nonwoven fabrics were investigated at 3% darkness.

The aim of this study is that the effect of hydrophility caused by the plasma application on dyeability properties of samples was investigated.

OP-181

**The Evaluation with Statistical Analyses of the Effect of Different Storage Condition and Type of Gas on the Properties of Plasma Treated Cotton Fabrics \***

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In this study, cotton fabric was treated with oxygen, nitrogen and argon plasma application. The plasma application was carried out for 10 minutes at low frequency. Firstly, contact angle of plasma treated samples was measured at the end of plasma treatment. The results showed that the plasma treatment causes to increase the hydrophility of samples. Moreover, it was seen that the type of gas affects the hydrophilic properties of samples. After then the samples were left during 1 month with different conditions which were under normal condition and covered with aluminum foil. Finally, the contact angle of plasma treated samples was measured after 1 month in order to determine the durability effect of plasma treatment on properties of cotton fabric. After the contact angle measurements, the results were evaluated with statistical analyses in terms of the type of gas and storage conditions of plasma treated samples. The results demonstrated that the storage conditions and type of gas affect the hydrophilic properties of plasma treated cotton fabric after 1 month.

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OP-182

**Oil Palm Leaf and Corn Stalk – Mechanical Properties and Surface Characterization \***

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Agro waste can be defined as a waste-wealth from agricultural plant. Oil palm leaf and corn stalk can be categorized as agro waste material. Fibre resources for pulp and paper are obtained from trees or agricultural crops. An oil palm leaf is one component of oil palm waste generated in Malaysia. In Malaysia, with large area of plantation of corn plant with around 8,600 Ha in 2010 and it generates large quantities of corn stalk discard as wastes. The corn stalk residues produced after harvesting season is an environmentally friendly source for the production of cellulosic fibre. At first, the comparison between oil palm leaf and corn stalk by mechanical properties from soda pulping process. After that, next method was focusing on surface characterization by Scanning Electron Microscopy (SEM). Both materials have a potential due to the mechanical properties (tensile, tear, burst and fold) and surface characterization, but corn stalk show more in strength and compactness due to fibre characterization compared to oil palm leaf. From this study, a corn stalk paper has a tensile index of 9.1 Nm/g, compared oil palm leaf, 7.9 Nm/g; Oil palm leaf has a tear index (1.8 Nm<sup>2</sup>/g) compared corn stalk (1.2 Nm/g); Corn stalk gives a good of burst index about 6.6 kPa\*m<sup>2</sup>/g rather but oil palm leaf shows low in burst strength (0.9 kPa\*m<sup>2</sup>/g); Folding test, corn stalk gives 2.5 Nm compared to oil palm leaf, 1.23 Nm. Corn stalk fibres show a closely packed arrangement and thicker fibre compared oil palm leaf. This study promoting the green technology in developing a friendly product and suitable to be used as an alternative pulp in paper making industry.

OP-183

**Investigation of the Colour, Fastness and Antimicrobial Properties of Wool Fabrics Dyed with the Natural Dye Extracted from the Cone of Chamaecyparis Lawsoniana \***

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In this study, the wool fabric was mordanted with natural mordant agents extracted from the waste of three different plants. After the mordanting process, the samples were dyed with the natural dye extracted from the cone of chamaecyparis lawsoniana. Finally, the fastness properties, K/S values and antimicrobial properties of samples were investigated in terms of the type of mordant used.

OP-184

**Shape-Memory Applications in Textile Design \***

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Extensive efforts have been made in the research and development of smart textile systems in recent years. One of these developments in smart materials is shape memory applications. Shape memory materials (SMM) are smart materials that can remember and recover substantial programmed deformation upon activation and exposing to an external stimulus such as chemicals, temperature, pH, light, a magnetic field, etc. Shape memory materials have been used in many areas and textile application of this technology has covered a wide usage recently.

Today's textile concept isn't the similar to past and expectations of people

from textile have been changing more and more. In this point, shape memory materials can answer these needs in textile due to its smart features. Shape-memory materials can be used in textile as clothing, yarn and fabric. The application possibilities are only limited by our imagination and creativity, so shape-memory productions have been able to gain a different aspect to textile.

**OP-185**

**Multi Response Optimization of Turning Operation with Self-Propelled Rotary Tool (SPRT) \***

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The self-propelled rotary tool (SPRT) is one of the new approaches to enhance the cutting tool performance by rotating the tool around its own axis during the process. The purpose of the study is to observe the cutting performance of SPRT in the turning operation of hardened EN24 steel by optimizing the cutting conditions. In the study, parameters such as horizontal inclination angle of the SPRT, depth of cut, feed rate and spindle speed were chosen as process variables while two conflicting factors; surface roughness (Ra) and metal removal rate (rMMR) were decided as performance parameters. Regression model was used to determine the quantitative relationships between the process variables in terms of performance parameters. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), Non-dominated Sorting Genetic Algorithm-II (NSGA-II)-TOPSIS Hybrid Model and Goal Programming methods were employed to obtain the optimum conditions. In the analyses, optimization was determined by minimizing the Ra and maximizing the rMMR. Consequently, Goal Programming produced better results among the applied models.

**OP-186**

**Application of Ohmic Heating System in Meat Thawing \***

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This study was conducted in order to determine the application of ohmic heating system in meat thawing and its effects on quality. The fastest thawing and the least weight loss were observed in the samples in which the ohmic method was employed ( $p < 0.05$ ). Considering the frozen storage period, an increase was determined in pH value and decrease was determined in aw and moisture values in consequence of all thawing methods applied on samples. When frozen storage period is taken into consideration, it was determined that there were statistically significant decreases in total general bacteria, Pseudomonas and Coliform microorganisms in consequence of all thawing methods employed in the research ( $p < 0.05$ ). If the thawing methods employed in the study are considered in terms of  $L^*, a^*, b^*$  values, it is seen that there is no statistical difference among groups ( $p > 0.05$ ). Consequently, it has been concluded that use of ohmic heating system to thaw frozen meat provides less weight loss and shorter thawing time.

**OP-187**

**Effect of Inlet Temperature on Pineapple Powder and Banana Milk Powder \***

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Fruits are the main source of fiber which gives great beneficial to human health. Consumption of fruits/fiber are incredibly low among youngsters especially little children. The study focuses on producing fruits and fiber powder as a means for easy transportation, storage and longer shelf life. The objective of this research work are to produce banana milk powder that can help children that suffers from constipation as well as to produce pineapple powder at lower inlet drying

temperature. The effect of spray and freeze dryer were studied for banana milk powder, whereas, spray drying method was chosen for producing pineapple powder. The effects of the type of dryers, pump feed speed in the spray dryer and the ratio proportion of the banana milk powder were investigated in the study. The result indicate that increasing proportion ratio of the banana milk powder produced lower yield of the powder. It was also concluded that speed 2 was the ideal condition for banana. Pineapple was found to be dried best at 25% maltodextrin concentration and 150 degree celcius as it produced the lowest moisture content at 4%db. Pineapple powder recovered the highest given as 80g at 150 degree celcius and 25% concentration of maltodextrin. Particle size of 4.097 micrometer was found to be the finest at the lowest inlet drying temperature at 130 degree celcius.

**OP-188**

**Hydrology Properties and Water Quality Assessment of the Sembrong Dam, Johor, Malaysia \***

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In recent years, monitoring quality of water body or reservoir has become a main concern for the determination of current condition and long-term pattern for future management. This study focused on hydrology properties and water quality of Sembrong Dam in Johor, Malaysia. The Sembrong dam reservoir is constructed on large lowland rivers with gradually sloping banks, it can be characterized by inundation of large areas, extreme horizontal variability with extensive shallow riparian vegetation and shallow reservoir. The secondary function of the dam was to provide a clean water supply to 240,000 consumers in Kluang district area were used for daily activities. Extrapolation beyond the data is often necessary to provide information needed for dam safety risk assessments. Thus, quality of the water from Sembrong dam important for future. The rainfall data were sourced from the Environmental Impact Assessment (EIA) report and the Department of Irrigation and Drainage, Malaysia whilst reservoir inflow data were extracted using a water balance equation. For water quality study, there were a total of 17 water quality sampling stations. The result indicated that Sembrong River Dam slightly shows high soil loss (487.12 kg/km<sup>2</sup>/day) where is consist of soft fine grained silty clay material with organic matter, tree roots and decaying timber. For rainfall and evaporation records are 1862 mm and 1098 mm. Sembrong River (Zone A) generally slightly polluted compared Merpoh River (Zone B) where is clear from pollution in Sembrong Dam. Due to Biological parameter where the Sembrong River shows a high of Total Coliform rather Merpoh River. The chemical parameters show that Sembrong River was not a good condition. According to Water Quality Index, Sembrong River was truly slightly polluted compared Merpoh River in Sembrong Dam. As a conclusion, Sembrong dam categorized as Class III according to NWQS.

**OP-189**

**Investigation of Air Quality in the Underground and Aboveground Multi-Storey Car Parks in Terms of Exhaust Emissions \***

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Exhaust emissions resulting from the motor vehicles have harmful and long lasting effects on both the human health and environment. Especially increasing concentrations of exhaust emissions in the closed environments and in the environments that cannot be sufficiently ventilated can cause damage on the human health and lead even to the death. The main harmful exhaust emissions based on the motor vehicles are gases such as CO (carbon dioxide), HC (hydrocarbons), and NOx (nitrogen oxides). In the circumstances of remaining under the influence of these gases, all the systems of the human body are generally get harmed. Therefore, the exhaust emission maps of the areas where there are the harmful exhaust emission concentrations in the high level, and the discharge methods of these gases in a very short space of time must be. In this study, the emission measurements have been carried out in four underground and five aboveground multi-storey car parks located in Istanbul.

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The effects on the human health of the measured fields were studied by the use of the results of the performed measurements, by comparing them with the maximum allowable concentration (MAC) and the threshold limit value - time weighed average (TLV – TWA) values. Taking into consideration all of the measurement results in the under-ground and above-ground multi-storey car parks, it is determined that the short-term use of the measured fields do not pose any risks in terms of human health. The suggestions regarding the improvement works of the car-parks were presented.

**OP-190**

**Application of Finite Element Method to Determine the Performances of a Line Start Permanent Magnet Synchronous Motor \***

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In this paper, low power Line Start Permanent Magnet Synchronous Motors (LSPMSM) are analyzed and simulation by finite element method using ANSYS RMXprt and Maxwell 2D/3D modeling software. For the application three motor parameters are changed, modeled than put to the simulation. While the motors are analyzed, motor dimensions aren't changed. After motors are modeled by RMXprt, the models are transposed to maxwell and observed the magnetic field distribution. The torque and efficiency curve are acquired and compared each other. Consequently, the results are evaluated feasibility for the industrial area in terms of efficiency and torque.

**OP-191**

**Do Demographic Characteristics Make a Difference on Housing Investment Preferences? Household Survey for Istanbul \***

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Innovative approaches in the construction industry can contribute the market to reach equilibrium. When the housing projects are developed, to consider demographic characteristics of the people within the target market is important in terms of the success of the project. The aim of the study is to identify whether there is a effect of demographic characteristics such as gender, age, marital status, education level, occupation and income level on housing investment preferences. In this study, survey techniques has been applied on a sample size of 784 people selected from households living in Istanbul and the viewpoint of households to housing investments has been evaluated through SPSS program. The effects of demographic characteristics on housing investment preferences was tested with chi-square test. The attitudes to alternative investments, ownership status, purposes of buying house and using financial methods was analyzed.

**OP-192**

**Innovation for a New Tax Incentive: Patent Box Regime Turkey and the European Union Application \***

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Countries make reductions in direct tax rates to attract foreign investments. In order to avoid this situation leading to an unfair tax competition, instead of decreasing the corporation tax wholly, tax incentives for industrial property rights which contribute innovation are preferred. The dynamism of industrial property rights is higher compared to the other production factors and it is more susceptible to tax incentives. Lately, countries have begun tax incentive applications called either “ patent box regime” or “innovation box regime” in order to attract innovative international companies to themselves. For the first time in 1973, “patent box regime” began to be implemented in Ireland and spread rapidly. In this content, this application was entered into force in such

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countries: France (2000), Hungary (2003), Belgium and the Netherlands (2007), Spain, Luxembourg and China (2008), Malta (2010), Liechtenstein (2011), England (2013), Portugal, Italy and Turkey (2014).

Patent box regime is a promoting factor which proposes low taxation for the earnings from directly commercialized patents and from the other industrial property rights. In addition, its structure is result-oriented and incites innovation. In this study, “patent box regime”, a kind of a tax incentive which is provided by the countries in order to enhance their international competitive capacities in the field of innovation, will be examined. In this content, the applications in Turkey and in the European Union will be discussed comparatively and potential difficulties in the application will be mentioned.

**OP-193**

**Election of Deputy Candidates for Nomination with AHP-PROMETHEE Methods \***

*Halim Kazan, Salih Özçelik, Elif Haylar Hobikoğlu*

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Countries are governed with different regime and government forms. Qualified human factor is needed for operating different regime and governments. In this study; which qualification or factors they take into account constitute the aim of the research while political parties desiring for government of our country determine their deputy candidates for nomination.

Common 15 basic criteria they take into consideration while political parties elect deputy candidates in general sense were determined. Criteria weight was determined with AHP method by applying FARE (Factor Relationship) method into the evaluations made by party representatives. Multi-criteria decision-making (MCDM) techniques were applied into these basic criteria. 10 sample deputy candidates were ranked according to PROMETHEE method by the criteria weights obtained with AHP method. Correlation analysis was made among ranking and general ranking obtained was presented as sample ranking method. While this study offers solution for the problem of deputy candidate specifically, it presents participatory decision-making method in cases decision-makers should take opinions of several persons into consideration

**OP-194**

**Is Turkey's “Technological Balance of Payments” Balanced? \***

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In a globalized world, the competition is coming to heat in the area of creating “new technologies”, and consequently, regional integration attempts are gaining momentum. The export of advanced technological products reflects a country's ability to commercialize the results of researches and technological innovations in the international markets. Beside the advanced technological products, countries can also purchase and sell information which is intangible. This transaction is measured via “Technological Balance of Payments” that records the technical information and services that a country conducts the export and import of. TBP may give a clearer and more accurate opinion in terms of the development of an economy when considered along with other macro-economic parameters in a holistic approach, not by its own. TBP has a few important attributes. The first one is that it measures the international technology transfer related to the licenses, patents, the know-how, research and technical assistance. The second one is that TBP is the component of general balance of payments that reveals the international commercial and economic relations in a foreign exchange-weighted and statistical way. Today, it is evident that a country can enhance its economic, and consequently, political efficiency to the extent that it can be competent in science and technology, and therefore, innovation; and accordingly, it can be decisive in the regional and global power balance. The technological power of a country requires the competitive power along with it. While the globalization is making in what amount countries produce and use the weapon of technology, it forces Turkey to record the technological data. This study aims to discuss the application problems of science and technology and reveal the related obstacles/challenges with TBP. The subject will not be investigated quantitatively but qualitatively since no databank is available concerning TBP.

OP-195

**Urban System of Innovation: Main Agents and Main Factors of Success** ✱

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The paper that follows studies the concept of the “urban system of innovation” and its possible methodological framework of analysis. The paper is structured as follows: Section one is the introductory section, in which the main idea of a system of innovation and how the city became gradually its main point of interest is analyzed. Section two deals with the theoretical and empirical analysis of the concept of the urban system of innovation, reviewing this way related studies and reports. Section three focuses on some methodological issues. Section four describes the examples of four urban systems of innovation, namely those of San Francisco, Los Angeles, New York and Boston. Section five is a section that synthesizes in an attempt to first identify the key factors associated with the rise of these areas as successful cases of urban system of innovation and second propose a methodological framework for their analysis. This implies, among other things, indentifying its main and secondary actors- players, posing their main field of policy action and describing the necessary interactions between them. The “urban system of innovation” concept is an emerging one, which means that it is now shaped, structured and developed. Malfunctions and distortions are part of its initial formation. The existing concept of innovation system doesn't deal with the unique societal aspects that tend to be formed upwards and downwards the urban environment. An innovation system of such a small scale has to pay attention not only to the economic actors but also to the whole spectrum of societal challenges. Therefore, now it is the ‘critical’ time to put the basis for future successful cases.

OP-196

**The Role of Taxation Problems on the Development of E-Commerce** ✱

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Nowadays e-commerce has become a vital part of our daily lives. The effects of globalization and rapid developments are experienced in knowledge and technology raises level of e-commerce. E-commerce provides firms to sell their goods and services with a different method around the world and admits to buyers to access goods and services easily. Taxation of e-commerce is an important issue for countries, firms and buyers who want to be a party of e-commerce. The issues such as tax loss and tax evasion are crucial in terms of countries. Difficulties like uncertainty and double taxation make parties of e-commerce reluctant and affect development of e-commerce negatively. In this study, the role of taxation problems on the development of e-commerce will be examined. We will aim to focus on how e-commerce can be developed with proper tax regulations.

OP-197

**The Environmental Kuznets Curve and Corruption in the MENA Region** ✱

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One of the current concerns of our planet is the degradation of the ecosystem which seems to be ascribable with the climate changes and which is likely to cause strong negative externalities which threaten the wellness of the populations as well of the countries developed as in the countries in the process of development.

This research aims to study the effect of corruption on pollution and per capita income of 22 countries from the MENA region over the period 1996-2013, through the use of a dynamic panel data model. The main statements issued from this empirical test stipulate a positive direct impact of corruption on per capita emissions and a negative indirect effect of corruption on per capita income.

Our results support also the Environmental Kuznets Curve hypothesis for carbon dioxide.

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The environmental quality deteriorates at early stages of economic growth and subsequently improves at a later stage.

OP-198

**Speciation and Availability of Heavy Metals on Serpentine Soil and Paddy Yield** ✱

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There has been increasing concern in recent years regarding toxic elements transfer in the soil-plant system. Soils developed on serpentinitic rocks have serious limitations for agriculture. They have high levels of magnesium (Mg) and heavy metals such as nickel (Ni), chromium (Cr), cobalt (Co), and manganese (Mn) and are deficient in some essential macronutrients. The continuous accumulation of serpentine soil downward in the Ranau Valley paddy field brings by excessive erosion and high rainfalls through the main irrigation systems and overflowing flood streams. The presence of serpentine soil contamination is clearly evidenced by oily water and reddish paddy soil. Therefore the basic objective of this work is to examine the availability and mobility of certain elements by assessing the chemical properties of paddy soil and the soil-plant interaction as induced by the effect of serpentine. In this study the transfer of abundant metals (Ni, Cr, Co, Fe, Al and Mn) was investigated from a paddy field soils to different parts of *Oryza sativa* L. (cultivar YTM Sarawak Merah) through modified metal speciation procedures; that are available and residual fractions. The development in paddy yield, nutrient content and heavy metals accumulation in the paddy soil and yield are reported. Parameters monitored in this study include soil characteristics and yield efficiency at the full crop stage. The heavy metals in the area were potentially bioavailable since the soils are acidic (pH 5.60 – 6.15) which suggested a medium nutrient availability, have high silt (33.21-69.02), lower clay (13.55-46.98) and sand (7.41-33.44) contents and higher metal concentrations associated with the residual fractions. Prediction models were developed with combination of the metals bioconcentration factor (BCF), and soil pH, organic matter (OM) content, and cation exchange capacity (CEC) through multiple stepwise regressions.

OP-199

**Rosa Bitamina (Organic Fertilizer) Effects in Enhancing *Rosa Centifolia* Resistancy and Flowering Process** ✱

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Rosa Bitamina (RB) is an organic fertilizer made from marine-waste product such as shrimp shells, fish carcasses and anchovy heads. This product applied a 3R waste management system which reduced waste products by reused it in production of a new product. Objective of this study is to observe effects of RB towards *Rosa centifolia* resistancy and flowering process. This fertilizer was produced by grinding dried marine-waste product to small particles. Rose plant with same maturity were used and divided into three different treatments which are T1; control (soil only), T2; soil +commercial fertilizer, T3; soil +RB and T3; soil +RB +charcoal. All samples were placed under plant house condition with 12 hours light exposure for 8 weeks observation. Assessment was conducted on physical assessment through an observation. On week 2, all samples for T3 and T4 showed changes except sample from treatment T1 and T2. T1 and T2 only showed a development on week 4. All leaves remains green and dewy throughout the observation. Thus, RB can enhance the flowering process of *R. centifolia* up to 2 weeks earlier compared to the untreated *R. centifolia*. Plant resistancy also improved by applying Rosa Bitamina since all sample remains fresh until day 8 weeks of observation.

OP-200

**Mapping of Biochemical Constituents in *Platanus Acerifolia* Leaves by Analytical Techniques \***

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*Platanus acerifolia* (Plantanaceae) is a woody perennial tree, a native of Europa, and Asia regions of the world. It is commonly cultivated and highly valued as an ornamental and medicinal tree. Its leaves as a natural waste is available in abundance, easy to obtain and cheap.

In the present study, *P. acerifolia* leaves were obtained from Kocaeli region of Turkey at the autumn period. All of the specimens were dried in air before using analytical techniques. The leaves were analyzed by using X-ray Diffraction (XRD), Attenuated Total Internal Reflectance-Fourier Transform Infrared Spectroscopy (ATR-FTIR), Scanning Electron Microscopy-Energy-Dispersive X-ray Spectroscopy (SEM-EDX). All analysis were performed for providing detection of leaf molecular structure, crystalline phase, chemical compositions (organic or inorganic constituent), elemental index, morphology and microstructure.

From X-ray diffraction pattern, crystalline phase and chemical composition of the leaf specimens were identified as whewellite ( $C_2CaO_4 \cdot H_2O$ ), schertelite ( $Mg(NH_4)2H_2(PO_4)_2 \cdot 4H_2O$ ), silicon oxide ( $SiO_2$ ), amide ( $C_{13}H_{17}N_7O_3$ ), ester ( $C_{37}H_{68}O_8$ ) and benzene ( $C_{28}H_{40}O_{10}$ ). According to ATR- FTIR results, characteristic peak value of the leaf specimens were detected functional groups as (P-O), (C=O), (Cl≡O), (C-O), (P-O-H), (C-H), (N-H), (O-C=O), (K-N≡O), (Ca-C≡O), (N≡H), (C=H), (N=O), (O-H), (C≡H), (N≡N), (Si-O-Si). SEM-EDX analysis showed the present of carbon, nitrogen, oxygen, magnesium, silicon, phosphor, chloride, potassium, calcium in the leaf specimens. Morphology and microstructure of the opened or closed stomas and fibers of leaf specimens were monitored.

The chemical compositions, the functional groups and the elements are responsible for various medicinal properties of *P. acerifolia*. Nanoparticles obtained from the leaves by using developed plant extract process can be used as a biomaterial, biosorbent and nanomedicine against various human, plant and animal diseases or pathogens.

OP-201

**Investigating the Oxidative Function of the *Scytalidium Thermophilum* Catalase \***

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*Scytalidium thermophilum* produces a catalase with phenol oxidase activity (CATPO) that catalyses the dismutation of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) to dioxygen and water and also oxidizes several phenolic compounds in the absence of hydrogen peroxide. It comprises 717 amino acids with a 19 amino acid signal sequence, and a 17 amino acid prosequence. It is a homotetrameric protein of molecular mass 320 kDa and subunit molecular mass 80 kDa.

Although catalases have been studied for many years, a peroxide independent oxidative activity of catalases has recently been recognized. There are a great number of reports available describing the structural and biochemical characterisation of catalases. However basic questions related to substrate and product flow remain unanswered, particularly related to the oxidase activity.

The goals of our current studies are to investigate the region of CATPO that corresponds to the NADPH binding region of Bovine liver catalase and the lateral channel known as one of three channels that connect the deeply buried active site to the exterior of the enzyme. We have introduced a number of mutations into this region and are analyzing their specific activities and sensitivities to various inhibitors.

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OP-202

**Anti-Microbial Activity of Chloramphenicol from *Streptomyces sp.10CM9* \***

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An antimicrobial agent, chloramphenicol, was isolated from Actinobacteria 10CM9. The strain was isolated from lake sediment collected from Erçek Lake, Van (38°29'57.76"N and 43°33'10.98"E) and A1A medium was used as a isolation medium. 16S rRNA gene sequence analysis that showed the strain belongs to the genus Streptomycetes. A fermentation study in A1A broth medium (3L) followed by extraction with EtOAc afforded 105mg of crude extract. A bioactivity-guided fractionation by Open Column chromatography on silica gel led to the isolation of one secondary metabolite (10CM19-01, 31 mg). Structures of the metabolites were established as chloramphenicol, by means of NMR (1H, 13C, COSY and COSY) data. Antimicrobial activity of 10CM9 was tested by microdilution method against enteropathogenic *Escherichia coli* 0157:H7 (RSKK 234), methicillin resistant *Staphylococcus aureus* ATCC 43300, vancomycin resistant *Enterococcus faecium* DSMZ 13590, *Candida albicans* DSMZ 5817 and *Pseudomonas aeruginosa* ATCC 27853. As a result, 0.5 µg/ml, 0.5 µg/ml and 1 µg/ml MIC values were observed against *Escherichia coli* 0157:H7, *Enterococcus faecium* and *Staphylococcus aureus*, respectively.

OP-203

**Tunisian Wetlands Valuation Elements and Sustainable Development: Case of Sebkhate El Kelbia Sousse Tunisia**

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The conservation of wetlands is now regarded as an urgent measure to be implemented for national and intergovernmental strategies. This work tries to take a progressive approach to contemplate a typical wetland "Sebkhate El Kelbia in Sousse-Tunisia". Analytical research based on several disciplinary tools including carto interpretation, delimitation of natural landscapes and the archaeo-landscape restoration, through the study of centuriation demonstrates the importance of the area on ecological plan, heritage and landscape. The analysis of this territory wrongly considered "marginal" shows that different interventions (policy, forest and land) interact with each other and act in a direct way the landscape forms and are a must for any planning and / or a territorial reorganization. Landscape parameters are also proposed, which are based on the densification of the vegetation of halophyte and forage type applications compared with farmers in the region. The involvement of differential management of hybrid "agri-entertainment wetland" will be another resource for the enhancement and development of threatened territories

OP-204

**The Effect of Dyeing Properties of Fixing Agent and Plasma Treatment on Silk Fabric Dyed with Natural Dye Extract Obtained from *Sambucus Ebulus* L. Plant \***

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In this study, the natural dye extracted from the fruits of *Sambucus Ebulus* L. was used to dye silk fabric. Prior to the dyeing process, the samples were exposed

to oxygen plasma pre-treatment at low frequency for 1 and 5 minutes. Following the plasma pre-treatment, the samples were dyed with the natural dye by the use of conventional and microwave dyeing methods. After dyeing procedure, the samples were treated with three different fixing agents. Finally, the effect of plasma pre-treatment and microwave energy, and type of fixing agent as a dyeing procedure on colour fastness to light, rubbing and washing and also the colour strength of the samples were investigated. According to the results, the increase on plasma treatment time and microwave energy increased the colour strength of samples. The fixing agent treatment did not affect much as the colour fastness properties of dyed samples.

**OP-205**

**The Effect of Surfactants on the Efficiency of Lead Acid Batteries \***

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The aim of this study is to show the effect of two phosphonate surfactants (PS) on the electrochemical behavior of the negative plate of lead-acid battery in the sulfuric acid medium. The characterization of the electrode interface was investigated at room temperature by a set of electrochemical techniques as linear sweep voltammetry (LSV), cyclic voltammetry (CV), electrochemical impedance spectroscopy (EIS) and chronoamperometry (CA). Scanning electron microscopy (SEM) was employed to determine the film layer's morphology deposited on the surface of working electrodes, in the presence and in the absence of the PS. When the PS was added in the acidic solution, hydrogen evolution became higher, the over-potential of hydrogen was shifted to negatives values and the growth of the anodic  $\beta$ -PbO<sub>2</sub> was inhibited. SEM imaging with the presence of PS showed reduction in the growth of the anodic  $\beta$ -PbO<sub>2</sub> and PbSO<sub>4</sub> layers. EIS results indicate the decrease of the conductivity of  $\beta$ -PbO<sub>2</sub> film on the lead surface electrode. The result of the CV, show a decrease in the peak related to transition of PbO to Pb demonstrates that lower PbO has been formed underneath the lead sulfate membrane in the presence of low concentration of SP indeed a decrease in the amount of formed PbSO<sub>4</sub> on the electrode surface.

**OP-206**

**Preparation and Characterization of Chitosan/ Polypyrrole/ Sepiolite Nanocomposites \***

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In this work, Chitosan / Polypyrrole/ Sepiolite (Cs/PPy/Sep.) Nanocomposites (NC) were synthesized with pyrrole and chitosan via redox polymerization in aqueous media with magnetic stirrer system in presence of ammonium cerium (IV) nitrate (Ce+4) and sepiolite at room temperature. The roles of the oxidant/monomer mol ratio, on the yield, conductivity and morphology of the resulting products were investigated. Chitosan/ Polypyrrole/ Sepiolite Nanocomposites (Cs/PPy/Sep.NC) were prepared with the oxidant to pyrrole mole ratio 0.67:1 showed conductivities  $4.2 \times 10^{-4}$  S/cm. The oxidant to pyrrole molar ratio 0.67 is proposed to be the optimum stoichiometry for the better conductivity while the ratio for the highest yield was obtained for molar ratio of 1.0. The obtained results showed that ESEM micrograph for the surface of Chitosan/ Polypyrrole/ Clay Nanocomposite has average size of 28.63 nm. The yield of the product (polymer) and electrical conductivity of the product are investigated as physical characteristics. The electrical conductivities of Cs/PPy/Sep.NC were determined by four point probe technique. In addition, the resulting NC are characterized with spectroscopic method that is Fourier Transform Infrared Spectroscopy (FTIR), and also morphological method, which is Scanning Electron Microscopy (SEM).

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**OP-207**

**The Synthesis of Biodiesel from Vegetable Oil \***

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Biofuels intended to replace the fuel from petroleum. They are a sustainable alternative to fossil fuels because they are renewable and less toxic to the environment.

This work aims, firstly, to eliminate one of the major pollutants olive residue and waste vegetable oils such residues have become a double necessity; ecological and economic, transforming them into value-added, namely biodiesel. And, secondly, to contribute to sustainable development by offering a renewable energy source meeting the energy issues of the day as the mastery of greenhouse gas emissions and preservation of non-renewable fossil resources. The use of reclaimed vegetable oil from restaurants, for use as a fuel for road vehicles, has received a lot of attention in recent years. Used vegetable oils contain solids and free fatty acids due to oil breakdown during the frying process. The synthesis of biodiesel by transesterification of vegetable oils was carried out in this study. Two varieties of oils are used in this work, the first type is the waste oils used in frying and the second are olive-pomace oils. Waste oil residue becomes harmful to the environment. To remedy this, recovery becomes a necessity. In this experiment we determine some physicochemical properties of the oils used and biodiesel obtained.

At the end of this study, a comparison of our results with the Algerian standard showed that biodiesel has properties of diesel and biodiesel addition improves cetane number and some other parameters.

**OP-208**

**Cd(Cl3)- vs (CdCl4)2- in Hybrid Materials \***

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Over the last decade, there have been increasing numbers of reports on compounds resulting from the combination of amines with biologically important metal ions, in order to obtain structural information on the mode of the interaction between them (Moon and Choi., 2014). Generally, the organic cations contain ammonium groups linked to the anionic framework by hydrogen bonds via halogenous tetrahedral vertices (El Glaoui et al., 2011), (Boufas et al., 2009).

In this work, we present the structure of four compounds based on CdCl<sub>3</sub>- or CdCl<sub>4</sub><sup>2-</sup>. The examination of their structures reveals different coordination of cadmium sites depending to the nature of the organic moiety. It adopts a distorted pyramidal or tetrahedron configuration, octahedral coordination in double chains or infinite chains (CdCl<sub>6</sub>)<sub>n</sub>.

**OP-209**

**Chemical Shifts of K $\alpha$  and K $\beta$ <sub>1,3</sub> X-Ray Emission Spectra for Oxygen Compounds of Ti, Cr, Fe, Co, Cu with WDXRF \***

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Chemical shifts and full widths at half maximum intensity (FWHM) of K $\alpha$  and K $\beta$ <sub>1,3</sub> x-ray emission lines and differences of full widths at half maximum intensity ( $\Delta$ FWHM) using metallic element as reference for these emission lines were measured for oxygen compounds of elements in the range  $22 < Z < 29$  with a Wavelength-Dispersive X-Ray Fluorescence spectrometry (WDXRF). It was also found larger chemical shifts and FWHM for K $\beta$ <sub>1,3</sub> lines than those



of Ka ones. It should be noted that the magnitude of chemical shifts increases with increase in the numbers of ligand atom.

**OP-210**

**Dielectric Properties of Al/Poly(Methyl Methacrylate)(PMMA)/P-Si Organic Schottky Devices \***

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Al/Poly(methyl methacrylate)(PMMA)/p-Si organic Schottky devices were fabricated on a p-Si semiconductor wafer by spin coating of PMMA solution. Capacitance–voltage (C–V) behavior of the Al/PMMA/p-Si structures was studied at various frequencies ranging from 30 kHz to 1 MHz and for a bias voltage range of -4 V to +4 V. The frequency and voltage dependent dielectric constant of Al/PMMA/p-Si have been investigated. The real dielectric constant ( $\epsilon'$ ), imaginary dielectric constant ( $\epsilon''$ ), loss tangent ( $\tan \delta$ ), AC electrical conductivity ( $\delta AC$ ), real ( $M'$ ) and imaginary electric modulus ( $M''$ ) values of PMMA thin film were determined. Experimental results indicate that the values of  $\epsilon'$  show a steep decrease with increasing frequency for each voltage. The values of  $\epsilon''$  versus voltage curves show a jump, and  $\epsilon''$  decreases with decreasing voltage and increasing frequency. A little increment of the  $\delta AC$  on frequency is observed. The  $M'$  increases with increasing frequency. Also, the  $M''$  shows a peak and the peak position shifts to higher frequency with increasing applied voltage. It can be concluded that the interfacial polarization can be more easily occurred at low frequencies, and the majority of interface states at metal semiconductor interface, contributes to deviation of dielectric properties of Al/(PMMA)/p-Si structures.

**OP-211**

**EPR Study of Cr<sup>3+</sup> Ions in AlF<sub>3</sub> Amorphous at X-Band Frequency and Versus Temperature \***

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Amorphous AlF<sub>3</sub> doped with 0.15, 1 and 2wt.% CrF<sub>3</sub>, obtained by dehydration of  $\alpha$ -AlF<sub>3</sub>·3H<sub>2</sub>O, were studied by Electron Paramagnetic Resonance (EPR). The experimental studies upon powdered amorphous doped with various Cr<sup>3+</sup> concentrations have been achieved at X-band frequency and versus temperatures. The EPR spectra of all samples showed two principal resonance signals with effective g values at  $g \sim 4$  and  $g \sim 2$ . Evidence of two types of centers is obtained: the resonance at  $g \sim 4$  is assigned to the isolated Cr<sup>3+</sup> ions in distorted octahedral sites, whereas the resonance at  $g \sim 2$  may be due to both exchange coupled pairs of Cr<sup>3+</sup> ions with antiferromagnetic coupling and isolated Cr<sup>3+</sup> ions at axially-distorted octahedral sites. The distribution of spin hamiltonian parameters derived for solids with random ionic arrangement by Czjzek et al. is applied and give rise to the two bands of the spectra which were previously interpreted with two distributions.

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**OP-212**

**Neutron Shielding Properties of Concretes Containing Boron Carbide and Ferro - Boron \***

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Concrete is the most generally used shield material as it is inexpensive and adjustable for any construction design. Radiation shielding properties of concrete may vary depending on the concrete composites. Different types of special concrete have been developed by the addition of shielding material such as iron, boron carbide in aggregate formulation could enhance the capability and quality of radiation resistance property. In this paper, ferro - boron and boron carbide added to concrete shield in form of particle alloy were described as a shielding material and the properties of these shields were investigated by FLUKA Monte Carlo simulation code. According to the simulations results, it is clear that concrete by adding different proportions of boron carbide and ferro - boron can enhance neutron shielding property and ferro - boron added to concrete is the effective of neutron shielding than boron carbide added to concrete.

**OP-213**

**The Optical Properties of Cigs Thin Films Derived by Sol-Gel Dip Coating Process at Different Withdrawal Speed \***

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The copper indium gallium diselenide Cu(In,Ga)Se<sub>2</sub> (CIGS) thin-films deposited on soda lime silica glass substrates were dip-coated five times and annealed at 180°C. The advantages of CuIn(Ga)Se<sub>2</sub> thin films were its wide compositional tolerance, high conversion efficiency, flexibility, low cost of materials and high optical absorption in the visible spectrum. The effect of the withdrawal speed, on the optical properties of the CIGS thin films derived by sol-gel process detailed clearly in this study by transmission and reflection measurements with controlling the withdrawal speed. The prepared CIGS thin films had p-type conductivity. The significant blue shift of absorption edge as well as tuning of optical band gap was observed with the withdrawal speed. The CIGS thin films at four different withdrawal speeds were such as 60, 120, 200 and 300 mm min<sup>-1</sup> prepared from colloidal suspensions to control the nature of nanospheres in the CIGS texture, because the colloidal solution was utilised as a template to control the particle shape.

**OP-214**

**Created with Crystallized on Acesulfame of Metal Complexes [Mn(acs)2(H2O)4] Single Crystal Examination EPR \***

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Transition metal ion complexes (coordination compounds) have important applications in both the science and technology. Some of these complex are formed using paramagnetic metal ions Mn<sup>2+</sup>, VO<sup>2+</sup>, Cu<sup>2+</sup>, Fe<sup>3+</sup>, Cr<sup>3+</sup> and therefore are analyzed with EPR spectroscopy to provide structural information. The synthetic sweetener acesulfame is widely used in food and medicine as sweetener, and has widely used in cosmetics. The reason for widespread use depends basically on that acesulfame is easily digested and is not deposited in the body. Moreover it is not caloric sweetener. In addition, acesulfame used as ligands in transition metal complexes show thermochromic and solvatochromic properties. In this study, one of the complex structures formed with mixed ligands Mn(acs)<sub>2</sub>(H<sub>2</sub>O)<sub>4</sub> was produced and crystallized, and was examined by EPR spectroscopy. Structure of the complex was discussed.

OP-215

**Two Qutrit System for Controlled CNOT (Cnote) Gateway \***

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Quantum computation applications utilize basically the structures having two definite states named as QuBit (Quantum Bit). In spin based quantum computation applications like NMR and EPR techniques, besides the Spin-1/2 systems (electron and proton spins) there are many systems having spins of greater than 1/2. For instance in some structures, coupled two electrons can form triplet states with total spin of 1, and <sup>14</sup>N nucleus has, one of the widely encountered nucleus also have spin of 1. In quantum computation such systems are called as Qutrit systems and have the potential of use in spin based quantum computation applications. Besides the well-known CNOT gates in QuBit system, we suggest some CNOT gates for Qutrit systems composed of two Spin-1 systems, forming control and target Qutrits.

OP-216

**Importance of Technological Diffusion and the Turkish Case \***

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The usage of technological diffusion mechanisms is among the methods of developing countries to use and adapt new technologies. The mechanism of technological diffusion is the integration of worldwide technology accumulation to countries by numerous tools and methods. In other words, it is the diffusion of knowledge accumulation, reached by technology management, within and outside the country.

Technology policies are crucial for determining the speed, direction and route of technological development. It is of great importance by means of effective economy policies, to determine technology policies, which lets technology production and targets knowledge accumulation and qualified workforce. Economy policies established that are based on development levels and technological needs of countries, should fit with the countries' technological development and should guarantee the elevation of the technology level.

At this point, it is a must, to increase scientific effectiveness, to maintain university-industry cooperation, to support educational policies with technological development, to determine technology transfer policies, to maintain continuation and increase effectiveness of resources allocated to R&D expenses, to increase the number of patents received on behalf of the country, and to adapt all these to the policy.

In this study, the concepts and factors having important role related to technology policies and diffusion mechanisms; in light of the basic technological indicators, transnational comparisons were tried to be made, and solutions were provided by examining technology policies in Turkey.

OP-217

**Time for Digital Detox: Misuse of Mobile Technology and Phubbing \***

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With the expansion of the technology, people –especially the students- have a vast array of e-communication tools at their fingertips and feel as appertained to them. Current researches have estimated that 100% of university students have their own mobile phones and all of them bring their devices to the courses. Minority of the students use their smartphones to enhance learning, such as to look up pertaining information about the lesson, take pictures of information on the blackboard; however majority of them use smartphones for personal affairs during courses. Keeping in touch during lesson hinders students' learning experience and, it also occurs during examinations, although it is illegal.

The purpose of this study is to explore some of the challenges associated with mobile phones in college classrooms. A sample of students from different

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departments was surveyed to assess the extent to which the technology is considered a serious source of distraction in the classroom and also during the exams. We examined and enlightened several social aspects of this multifaceted larger societal theoretical concept of technological connectivity; namely, phubbing, cheating during courses and students' opinions towards cell phone regulations and instructor behaviors.

According to the results, the pattern of percentages within genders reveals the intention of students. Male students seem calmer, whereas female participants appear more sensitive about disturbing their classmates. The size of the classroom also has a big impact. As the class becomes larger, students behave more uninhibited and phub without being noticed. Majority of the students are distracted by their classmates and also confess that they can cheat with the help of their phones.

OP-218

**Bosnia and Herzegovina Telecommunication Sector Outlook \***

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The upcoming privatization of two remaining telecom operators in Bosnia, and not so recent privatization of one of the incumbent, are creating dynamic and changing sector environment for all participants – both incumbent and private ones. At the same time the investors are scanning the sector trying to find the right approach and market niche for more competitive start. The intention of this paper is to provide an overview of sector evolution over the past decade. We will start with core services figures, followed by financial overview for incumbent operators, comprehensive look at regulatory status and development, and finally mobile users' attitudes and determining factors of carrier section. What we will show is that sector development and the expansion of consumers' base is far from over. The services offered are still at rudimental level, and the potential owners of incumbent operators as well as new entrants will have considerable room for development. Financial analysis has shown that revenue for all three incumbent operators is stagnating, while the small private operators are experiencing steady growth. Although BH Telecom is still the biggest company in the sector it dose faces slight decline in net profit, while it's biggest competitor - Mtel in 2013 had biggest ROE.

Sector regulation, from state monopolies to liberalized competitive market, is almost at the end. Licensing arrangement are established; interconnection referent offers are common particle; LLU has been implemented; number portability is available; and in 2013 the wholesale of services and virtual mobile operators were introduced. Finally, the analyses of consumer's perspective has reveled existence of network effect in mobile market, and strong competition between two market leaders. In all, BiH telecommunication sector is still in its expanding phase and the potential owners of state operators as well as entrants will have competitive and well regulated market.

OP-219

**Exploring Benefits of a Web Based Testing and Training Tool \***

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Web-based training and testing tools are an important component of learning in numerous higher education institutions. Such tools are often implemented to provide students with more engaging and interactive learning experiences. To assess their benefits for various student success initiatives, an instrument must be developed and validated through an experiential study/survey. The purpose of this study is to redesign a previously validated instrument and use it to examine the impact of web-based training and testing tools on student learning from students' perspective and explore students' satisfaction level with the tool.

OP-220

**Yesterday, Today and Tomorrow of Big Data \*✳**

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Owing to the self-improvement desire, the human being always tries to reach to the current information and generate new ones from the data on hand. The practices are realized by processing and transforming the data, whose existence is broadly accepted, into information. Generating information from data is vitally important in terms of regulating the life. Especially firms need to store and transform data quickly and properly into information in order to achieve the objectives such as having a competitive edge, producing new products, moving the firm ahead and stabilizing the internal dynamics. The increase in the amount of data sources also increases the amount of the data acquired. Therefore storing and processing data become difficult and classical approaches remain incapable to do such transactions. By means of Big Data large amount of data with a wide range can be stored, managed and processed. Besides Big Data ensures proper information quickly and offers advantage and convenience to the firms, researchers and consumers by taking the properties of Volume, Value, Variety, Veracity and Velocity into consideration. This study consists of 5 parts. In the Introduction part the features, classification, the process, the areas of usage and the techniques of Big Data are explained. In the second part the appearance process and the advantages of the concept of Big Data are illustrated with examples. A detailed literature review is produced in the third part. The actual studies and the most interested areas of Big Data are told in this part. In the fourth part the future of the Big Data is evaluated. Besides the situation and distribution of the studies on Big Data in Turkey and all over the world is presented. In the Conclusion part, an overall assessment is included and probable troubles are mentioned.

OP-221

**Creating Online Storylines for Increasing the Knowledge Retention \*✳**

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Storyline creates a partnership between the teacher and the learners in which the teacher designs the 'line' – the chapters of the story, and the learners create and develop the story. The Storyline approach encourages children to study and search for information with a real sense of purpose. Students get involved in learning process actively and construct their knowledge in an authentic environment. Active learning in authentic learning environment supports long term memory and knowledge retention. The paper is an attempt to explore the views of students about storyline method on their knowledge retention. The results obtained indicate storyline method can enhance student retention of knowledge because it provides higher order thinking, technology usage, active, authentic and constructivist learning environment for students.

OP-222

**The Impact of Information and Communication Technologies on Company Performance: An Application on Manufacturing and Construction Sectors**

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This study aims to investigate the impact of information and communication technologies on company performance. In this context, the data is obtained from a survey which is conducted to companies that are operating in manufacturing and construction sector. This questionnaire was administered to 119 companies in the October-December 2014. By using the data, it is tried to investigate ICT usage level, the impact of ICT on the productivity of companies, competitiveness and innovation process, and also the government's ICT policy and regulation with the perspectives of companies. In the study, the rate of the companies which stated that the output of per employee is increased in the last three years is 33.7%. The rate of those who explain the rise of output for per worker by usage of ICT is 88.9% and the rate

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of those explain the rise by the usage of ICT and other factors is 70.0%. The rate of those explaining the decrease in operational costs by the usage of ICT is 91.7% and the rate of those explaining the decrease by both the usage of ICT and other factors is 94.7%. The rate of companies stating that the price competition is very important in the increase of market share when compared to past three years is 55.3%. It is determined that the rate of those who state that the importance of the price competition in the increase of market share is mostly due to the usage of ICT, is 79.1% and 72.2% is the rate of those who believe that this importance is due to both the usage of ICT and other factors. As a result it is determined that using ICT positively effects the productivity, competitiveness and innovation process of companies.

OP-223

**Analyzing Information Technology Status and Network Readiness in Turkey in Context of Diffusion of Innovation Theory \*✳**

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Although it's known that communication started with human existence, its becoming a scientific discipline coincide with early 20th century. Because mass media became common in these years and made its presence felt especially via press during World War One. The need of researching the effect of mass media has a great share in communication to become a discipline. The years between 1920-1940, as well as its problematical sides, is known as "strong effect" period. Even such similes like "hypodermic needle" or "magic bullet" were used for this period. Nevertheless, after understanding that the effect is not strong as predicted with a research performed during 1940 presidential election in USA, "limited effect" period started in communication science history. The next process belonged to a period which shaped around the idea that audience is active and central. "Adoption of innovation model", discussed in this study, is one of the theories that showed up in this period. Communication scientist Everett Rogers firstly presented this model in his book named "Diffusion of Innovations", published in 1962. The theory is predicated on the fact that "mass media has a significant effect on diffusion of innovations through society, however this effect is not so strong and it's important to figure out which of individual impact, presence of social conditions and mass media has the biggest effect". Besides, by means of the development of Information and Communication Technologies (ICT), it's also a fact that we are transforming into networked information societies. Within this scope, the aim of this study is researching impacts to readiness levels of people live in Turkey in the areas of social and economic issues, individual and business usage and digital content of decision making factors presented in the context of Diffusion of Innovations Theory and trying to comment the gained statistical results.

OP-224

**Multidimensional Construct of Technology Orientation \*✳**

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Strategic orientations are about creating firm behaviors parallel with firm strategy to influence employee norms, beliefs and values in order to provide sustainable competitive advantage in the long run. Technology orientation as a well-recognized strategic orientation is characterized by the degree of commitment to R&D, acquisition of new technologies and applications of the latest.

There are only 19 empirical studies consisting technology orientation as one of the variables in the literature. Although it is discussed at firm level in narrative studies, in empirical studies technology orientation is mostly considered in a single-dimensional construct and associated with R&D and manufacturing departments. However, technology orientation is not only related with final outputs of product innovation processes but also is about using, advancing and/or transferring technologies that will be used in those processes. Those

technology-based applications are more likely to lead a firm to increase its speed in production and provide cost advantages. Managerial efficiency is also expected to be improved via technological advances, which give accurate and timely information on decision-making. Moreover, rather than “creating new technologies” technology orientation also covers noticing a promising or accepted technology and, imitating and/or adopting it into the firm processes and/or production functions in order to be competitive.

This study proposed that technology orientation needs to be studied at firm level in a multidimensional construct. The main objective of the study is to constitute and operationalize the multidimensional construct of technology orientation. A two-step field study with a survey method was preferred.

Manufacturing firms in Izmir were in the focus of the study. In the final field study, 224 employees from 147 firms participated. According to the findings, a reliable and valid multidimensional technology orientation scale is employed, where the dimensions were named as top management capability, technological capability, commitment to learning and commitment to change.

### OP-225

#### **The Increasing Importance of Mobile Marketing in the Light of the Improvement of Mobile Phones, Confronted Problems Encountered in Practice, Solution Offers and Expectations \***

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Improvements in information and communication technologies introduce important marketing opportunities for companies. One of the last technological improvements affecting the marketing activities of the companies is mobile phones being used as a channel of marketing communication.

In the process of the promotion of the goods, services and ideas, this situation has increased the importance of ‘Mobile Marketing’ which can be identified as establishing the marketing communication with the target clients through mobile phones and sending promotion oriented messages.

This study will firstly touch upon the improvements in mobile communication technologies briefly. Thereafter, the increasing use of mobile phone and the growing importance of mobile marketing due to its advancing features will be revealed along with its benefits, and solutions will be offered by means of discussing the problems confronted. Finally, future oriented expectations will also be included.

### OP-226

#### **A Data Model to Support Context-Aware Mobile Cloud Collaboration Scenarios \***

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In mobile cloud computing systems, collaborators share the software and hardware infrastructure. Achieving a satisfactory throughput partly depends on providing a well-designed data model. It helps to achieve fewer database objects and improve data access, mobile cloud integration and service customization.

This study uses a XSD (XML Schema Definition) approach to provide a flexible Meta data. Exploiting such pliable model, mobile clouds will be able to achieve important objectives such as effective cloud integration and customization.

### OP-227

#### **An Application for Measuring Performance Quality of Schools by Using the PROMETHEE Multi-Criteria Decision Making Method \***

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Multi-criteria decision making techniques are extensively used in selecting the best one among alternatives. Sorting schools by measuring their quality of performance is also supposed as a decision-making problem. In this study, it is aimed to measure the performance of five secondary schools and two high

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schools with respect to achievement, non-attendance, social activities and projects criteria by using PROMETHEE outranking method in the scope of a local project. Study has been executed at the end of the 1st term of academic year 2014-2015. In consequence of the study, it is seen that secondary schools have better performance than high schools and town schools have better performance than village schools. Furthermore, it has been found out that there is a strong relationship between achievement and non-attendance criteria.

### OP-228

#### **An Experimental Study on Relationship between Student Socio-Economic Profile, Financial Literacy, Student Satisfaction and Innovation within the Framework of TQM \***

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The continuous change experienced in education, and the tough competition between universities compel universities to go into restructuring in terms of understanding students’ needs. Since the quality of the services provided by educational institutions is measured by the qualified work force, who graduate from these universities, the quality of education has utmost importance as a primary element that affects the quality of all sectors. In this context, by determining the needs and expectations of students from universities, one can offer new perspectives to develop innovative strategies in educational system.

Additionally, raising financial literacy levels of societies and spreading saving awareness should be a priority among the economic and social policies of the countries. The purpose of this study is to investigate whether the satisfaction students get from the opportunities provided by the university is effective on students’ socio-economic profiles. This study also aims to make a certain extent of contribution to the solution of the problems that hinder students from utilizing the services provided by universities. In this study, survey questions are asked to determine students’ expectations from universities and their opinions about the quality of services that universities provide. A total of 1004 students participated in the study. While frequency tables and MANOVA were employed in the evaluation of data, pareto analysis was utilized within the context of total quality management. Empirical results suggest that there is a significant relationship between the education levels of the students’ parents, the families’ social status and the way how students perceive the problems.

### OP-229

#### **DBMS as a Cloud Service: Advantages and Disadvantages \***

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The service which enables us to use computing as a service across a product is known as cloud DBMS. Cloud DBMS shares different resources and information between different devices which are located in different places in most cases based on internet communication. Is worth to be mentioned that number of these devices is expected to accrue in the future. Based on related research and results, there is an increment of interest in heritage of DBMS skills to third parties and to ensure that adaptation to the cloud will be done with low and cheap cost. In this paper, we will discuss about DBMS as a cloud service, advantages and disadvantages, opportunities and limitations and we thus express the need for a new DBMS, will focus on the way how to offer a cloud DBMS as one of the best services. In addition we will describe architecture of DBMS as a cloud service.

OP-230

**The Effect of Variations in Micro-Components of Domestic Water Consumption Data on the Classification of Excessive Water Usage \***

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Several studies have been conducted to explore the potential of using consumer data for the estimation of domestic water consumption. However, it is not an easy task to collect and record consumer data that precisely represent daily, weekly or monthly household water usage. This paper investigates the effect of variations in water consumption data on the classification of domestic water usage levels. Two datasets were used in this study. The first dataset consists of ten predictive variables related to household water usage. The second dataset was generated based on the first dataset where four generic features were created to represent water consumption based on four categories of activities related to water usage. Selected classification algorithms were used for classification task. The findings show that variations in consumer data have very little effect on classification outcomes suggesting that data collected from consumer suitable to be used for predicting excessive domestic water usage.

OP-231

**Systematic Review for Network Survivability Analysis in MANETS \***

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Network survivability analysis in MANETs was hardly an issues in the early years of wireless technology because there were no critical network system that depended on wireless technology yet. Today, network survivability analysis is an essential aspect of reliable communication especially in MANETs. Although various methods have been proposed to measure network survivability analysis in MANETs, no related review has been published as to date for this topic. Thus, a comprehensive review of this body of work would be beneficial to researchers to have an overview of the current state of research trend in this area. This paper provides a systematic literature review (SLR) of the state of the art approach in network survivability analysis in MANETs. We used studies from a number of relevant article sources, and our results showed the existence of twenty six articles. From this SLR we found that the existing of analysis method is focusing on individual node in which the node is treated as independent event. Furthermore, the analysis also reveals the less popular methods in analyzing network survivability are with statistical methods such as regression analysis and survival analysis. The implication of this study is to give a clear direction to future researchers in this area for a better and accurate analysis in measuring network survivability in MANETs.

OP-232

**Organisation Readiness Factors Towards IPv6 Migration: Expert Review \***

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Internet Protocol (IP) is one of the Internet addressing protocol that allows devices to link to each other. At present, the existing IPv4 protocol gradually been migrated to the new the protocol which is IPv6 to afford a larger address scale and to facilitate various improvements of the protocol. However, the organisation's readiness has been identified as one of reason lead the migration to be slower than it should. In our previous study, content analysis helps us to identify the component that may influence the readiness via several articles and journals. Thus, the factors can be categorized into two categories which are physical factors; IPv6 deployment (planning), equipment and cost, while

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human factors involve of knowledge, training and motivation. Therefore, by conducting on structured interview from several IT experts and practitoners, our aim is provide better understanding on the identified factors by analyzing their experiences and view. Results upon data collected show that they agreed with the factors that have previously been identified from literature. Finally, the factors can be used to develop a Organisation Readiness Model for assessing the organisation's readiness towards IPv6 migration process

OP-233

**Creating Scenarios and Using for Smart Systems Generated with Wireless Sensor Networks \***

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Smart homes can be identified as homes which can satisfy the needs of the residences with the help of the modules used, making their lives easier and offering safer, more comfortable and more economical living. Smart homes can be built with wirings or wirelessly. However, in our world where technology is rapidly advancing, with the wireless devices replacing wired devices the smart homes too are being developed wirelessly. The smart home systems allow the user to manage all electronic and electric devices in the house. None the less, one of the most significant features of the smart home homes is that even if the user does not run the system at all, scenario configurations with a small artificial intelligence in the background run. The scenarios are part of the system where the user defines cases that can occur in their homes once and then it gives necessary warnings when the cases defined do occur. In this study creating these scenarios for the smart systems and using of them in the wireless sensor networks is explained.

OP-234

**Solving the Yield Optimization Problem for Wafer to Wafer 3D Integration Process \***

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 Higher Institute of Management of Tunis

Three dimensional integrated circuits (3D ICs) that stack multiple dies vertically using Through Silicon Vias (TSVs) have gained wide interests of the semiconductor industry. Fabricating these 3D ICs using wafer to wafer stacking has several advantages including: high throughput, high TSV density... However, one of the major challenges that facing the wafer to wafer stacking is the low compound yield. Various techniques have been presented in the literature to address this important problem. This paper investigates the compound yield improvement for wafer to wafer stacking method. To solve this problem, we propose two approaches: mathematical multi-dimensional axial assignment model using ILP and matching pre-tested wafers based tabu search algorithm method.

We focus on the performance of these two algorithms to solve the problem within small time and maximum yield. Finally, we present the results of our thorough computational study. Results obtained on test problem and comparison with other algorithms from the literature show that our two algorithms gives better solutions.

OP-235

**Smart Technologies with Wireless Sensor Networks \***

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In recent years, the studies in inter-devices communication (M2M) which is considered to be the Internet, ecosystem of the objects have accelerated in line with the developments in mobile communication technologies. This way, development of systems making human lives easier in smart environment, smart agriculture, smart grid fields with monitoring purposes which can be considered among M2M implementations is now possible. This systems can be developed with sensor node platform which can detect and communicate.

Wireless Sensor Networks (WSN) consists of this sensor nodes containing simple processors, low power consuming antennas and various detectors. As the sensor networks do not require wired communication infrastructure, they can easily and inexpensively be formed with no harm to the environment.

The sensor nodes have the ability to store and process data locally thanks to the software and hardware structure they have. The fact that they can get in contact with each other enables them to collaborate in performing complicated tasks along with exchanging information. As the communication means have low power consumption, it ensures that the life of the sensor nodes is long. The fact, too, that the nodes are programmable after being placed in the medium provides greater advantages. Because of the low cost and flexibility in use, the wireless sensor nodes are convenient to be used in many industrial and environmental applications. In this study, -how to develop smart environment, smart agriculture, smart grid with WSN- is analyzed.

OP-236

**An Efficient Genetic Algorithm for Large Scale Vehicle Routing Problem Subject to Precedence Constraints \***

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The vehicle routing problem is a combinatorial optimization and integer programming problem seeking to service a number of customers with a fleet of vehicles. Vehicle routing problem has many applications in the fields of transportation, distribution and logistics. In this study, the vehicle routing problem subject to precedence constraints has been modeled as the Travelling Salesman Problem (TSP) with precedence constraints. Vehicle routing problem is difficult to solve using exact methods especially for large size instances due to computational expensive. Therefore, metaheuristic method based genetic algorithm has been developed to obtain feasible and optimal solution with less computation time. The conventional genetic algorithm procedure for TSP, with an order-based representation might generate invalid candidate solutions when precedence constraints are involved. In order to obtain feasible solution which does not violate precedence constraints, topological sort technique is used and integrated in the genetic algorithm procedure. In topological sort techniques, two different procedures of selecting the task in sequence namely 'earliest position' and 'highest priority' techniques is adopted. Two set of algorithms were developed and the performance as well as the quality of the solution were compared against several test problems. The results from the computational experiments demonstrate that the algorithm with 'earliest position', linear order crossover and inversion mutation has better results in terms of number of generations and computation time to converge to optimal solution. The genetic operators used in this study are capable to introduce new fitter offspring and does not trapped in a local optimum. Therefore, it can be stated that the genetic algorithm approach developed in this study is efficient in solving large scale vehicle routing problem subject to precedence constraints with the objective of minimizing the distance travelled.

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OP-237

**Conception of Virtual Private Networks Using IPsec Suite of Protocols, Comparative Analysis of Distributed Database Queries Using Different IPsec Modes of Encryption \***

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The world of Internet as such is open and insecure by nature. Companies and organizations exploit enormous possibilities that internet offers to build computer systems to enable communication and data sharing capabilities within their corporate platforms. In doing so, they continuously strive towards providing a fast, efficient and at the same time secure working environment by protecting their organizational assets.

Enterprises build their network infrastructure with intention to find reliable solutions to protect themselves from untrusted and cybercrime activities. In this sense, Virtual Private Networks (VPN) are primarily concerned about Data privacy. VPNs represent an extension of a private network made through added features like encapsulating the data packets with a header on both ends, along the lines of the communication as well as throughout setting communication tunnels using composite suite of protocols available. This paper offers a set of simulated secure data communication tunnels together with a comparison of results of the speed variables measured against the security through different encryption protocols between remote LAN's. These encryption protocols are ran onto distributed queries using various database functions.

OP-238

**Generating Digital Reputation Index: A Case Study \***

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Digital world is transforming wares to soft-wares, business to e-business, brick and mortar companies to online companies. The transformation trend is increasing exponentially and all the classical values and merits are questioned now a day. One crucial value of any company, which is interrelated with all the sub divisions and operations of the company, can be considered as its reputation. This paper mainly discusses the quantitative face of reputation from the social capital perspective and its transformation by the increasing and irrepressible power of technology. We attempt to answer the question "how to represent the digital reputation of the companies in a digital world?" under the effect of transformation from web 1.0 to web 3.0.

As a solution we propose a quantitative methodology for aggregating digital quantities collected from social network sites, company web pages, blogs and wikis and we propose a formulation and indexing method, built on different dimensions of digital world and by the way, the companies can be ranked respectively. As a case study, we focus on the stock market companies in Turkey and their digital reputation and we output a digital reputation index but more importantly we discuss the methodology of creating a digital index for the reputation of companies. Finally we conduct diagnostics on the output index to assess its degree of validity.

OP-239

**Vibration Control of a Column Using a Gyroscope \***

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Taking advantage of the angular momentum of the rotating gyroscope, gyrostabilizer systems are expected to become more widely actualized as they provide an effective means of motion control with several significant advantages for various structures. In this paper, a symmetric gyro with coupling to the tip mass of a column mounted on a vibrating base is considered. The non-linear motions of the gyro-column system and the equations of motion for the system are derived following energy (Lagrange) based approaches and examples provided. On the other hand, the effect of the angular velocity of the

gyroscope is studied, and it is shown that the angular velocity (spin velocity)  $\Omega$  of gyroscope has a significant effect on the behavior of the dynamic motion. It is also shown how the damper and spring due to the motion between the supporting gimbal and tip mass influence the dynamic behavior of the gyroscope. It was concluded that the numerical investigations of this combined system has not been investigated up to the present time.

**OP-240**

**Seismic Motion Control of a Column Using a Gyroscope \***

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Taking advantage of the angular momentum of the rotating gyroscope, gyrostabilizer systems are expected to become more widely actualized as they provide an effective means of motion control with several significant advantages for various structures. In this paper, a symmetric gyro with coupling to the tip mass of a column mounted on a vibrating base is considered. The non-linear motions of the gyro-column system and the equations of motion for the system are derived following energy (Lagrange) based approaches and examples provided. On the other hand, the effect of the angular velocity of the gyroscope is studied, and it is shown that the angular velocity (spin velocity)  $\Omega$  of gyroscope has a significant effect on the behavior of the dynamic motion. It is also shown how the damper and spring due to the motion between the supporting gimbal and tip mass influence the dynamic behavior of the gyroscope. It was concluded that the numerical investigations of this combined system has not been investigated up to the present time.

**OP-241**

**Modelling of Assessment of the Green Space in the Urban Composition \***

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The aim of this paper is to present a model that permits to assessment the quantitative green space and its costs in the urban. This approach is founded on the modelling of the functions and the corresponding spaces into an orthogonal parcel having a planar form. The elaboration of such as tool is a response to the sustainable urban development that recommends the optimization of land use. The summation of all spaces that compose the parcel defines the surface called plot surface. The green space into the parcel is a correlation of shape and disposition of the plots, and of the number of plots in the Master Plan. The urban composition is characterized by a mathematical system composed by two equations represented respectively by the urban density and the site coverage ratio. This system is indeterminate because there is one unknown: the building footprint; and one correlation: the plot surface. To solving this problem, it is demanded to use loop procedure, and finite difference method that consists to introduce a random value of urban density, then to compare the obtained density with the introduced value.

At last, the study finishes by the presentation of graphs illustrating the ratio and the costs of green areas in function with the urban density, and by the showing of the software.

**OP-242**

**Reactivity of Cementitious Additions on Properties of Micro Concrete \***

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Reactive powder concrete (RPC) is a new generation of concrete material which is actually a micro mortar with a maximum aggregate size not exceeding 0.630mm. It should be noted that when incorporating cementitious additions,

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this type of concrete shows a better homogeneity, an increased compactness of the cement matrix and an improved microstructure leading to high initial as well as final physic- mechanical performance in fresh and hardened state. The objective of this paper is to study the effect of the addition of dune sand and slag, finely ground on mineralogical, rheological and may thus be a simplified approach of that of the mixtures SD-RPC or S-RPC, in which the main reaction is the fixa mechanical properties of RPC.

The compactness of the cement matrix, principal source of strength gain, is closely linked to the consumption of portlandite occurring during hydration of cement silicates to produce new calcium silicate hydrates (C-S-H) more compact and insoluble in water. This so-called pozzolanic reactivity depends on the nature and structure of the used cementitious additions. In order to better evaluate the gain in strength of the RPC containing finely ground dune sand (SD) and slag (S), the microstructural aspect has been examined by X-ray diffraction. The study of mixtures SD-lime and S-lime tion of lime, resulting from cement hydration to produce additional C-S-H. In this work, the results obtained from tests carried out on RPC show that both compressive and tensile strengths increase when incorporating mineral additions in cement, thus improving the compactness of mixtures by their filler and pozzolanic effects.

**OP-243**

**New Concept for Indoor Firefighting Robot \***

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In this paper, a new concept of indoor firefighting robot is proposed and developed. It has the capability to climb stairs and negotiate several types of floor materials inside buildings. it can withstand high temperatures up to 700 c for about 60 minutes using multiple thermal insulation technique. It can communicate with trapped and injured victims inside the fire seen and can send video and audio information to the control unit describing the fire environment inside the building. Several of those firefighting robots can be launched to work together collaboratively with the assistance of a remote control unit. If the robot is outside the building it can use camera and sensors such as Gps, gyro,compass, etc for navigation.

**OP-244**

**Nonlinear Motion Control of a Column Using a Coupled Gyroscope \***

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<sup>1</sup>Gümüşhane University

<sup>2</sup>Karadeniz Technical University

Taking advantage of the angular momentum of the rotating gyroscope, gyrostabilizer systems are expected to become more widely actualized as they provide an effective means of motion control with several significant advantages for various structures. In this paper, a system of the gyroscopes coupled via a massless torsional spring and a massless torsional damper mounted on the tip mass of a column subjected to a vibrating base is considered. The non-linear motions of the gyro-column system and the equations of motion for the system are derived following energy (Lagrange) based approaches and examples provided. On the other hand, the effect of the angular velocities of the gyroscopes are studied, and it is shown that the angular velocity (spin velocity) of a gyroscope has a significant effect on the behavior of the dynamic motion. It is also shown how the damper and spring due to the motion between the supporting gimbals influence the dynamic behavior of the column. It was concluded that the numerical investigations of this combined system has not been investigated up to the present time.

OP-245

**Augmentable Multi-Vertebrated Modular Space Station Robot \***

*Serkan Kurt*

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On space stations, movement capacity of the repairment with the space suits are very restricted and dangerous. Not only movement but also traveling from somewhere to somewhere is also difficult itself. With the help of multi-axis modular vertebrates the ability to access the places we want, high movement capacity, plug and play structured robot is designed. Robots height is increased at the intended amount with the basic addition of an independent vertebrae.

OP-246

**Personality and Gender as Predictors of Entrepreneurial Cognitive Adaptability**

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Cognitive adaptability, defined as ability to quickly make sense of the changing business environment and act accordingly, is an emerging realm of entrepreneurial research. The aim of the present study was to develop and validate a relationship between cognitive adaptability (CA) of entrepreneurs and Big Five Personality traits. The role of gender difference in this relationship was also investigated. By using theories of personality development, social learning, situated cognition, and meta-cognition a logical relationship between personality traits and entrepreneurs' cognitive adaptability was established. Quantitative strategy and cross-sectional survey method was deployed to collect data. Randomly selected 443 entrepreneurs responded to this survey. Factor analyzed structural equation modelling (SEM) demonstrated good model fit and estimated cognitive adaptability as a second order factor, having a significant impact of extroversion and neuroticism on cognitive adaptability. Multi-group moderation revealed a significant difference among females and males.

OP-247

**Innovation and Creativity: Inspiring the Next Generation in the Ethekwini Municipality**

*Anneline Chetty*

*Economic Development, Ethekwini Municipality, Durban, South Africa*

Innovation is not always born in a sterile lab or is not always about applications and technology. Innovative solutions to community challenges can be borne out of the creativity of community members. This was proven by Professor Anil Gupta who for more than two decades scoured rural India for its hidden innovations motivated by the belief that the most powerful ideas for fighting poverty and hardship will not come from corporate research labs, but from ordinary people struggling to survive. The Ethekwini Municipality is a city in South Africa which adopted a similar approach, recognising the innovativeness of youth (students and school pupils) in its area. The intention was to make the youth a part of the solution to challenges faced by the Municipality. In this regard five areas were selected and five groups of students were identified. Each group was sent into the community to identify challenges and engage with community leaders as well as members. Each group was tasked to come with solutions to these challenges which were to be presented at an Innovation Summit. The presented solutions were judged and the winning solution would be implemented by the Municipality. This paper documents the experience of the students as well as the kinds of solutions that were presented. The purpose is to highlight the importance of using the ingenious minds and creativity of youth and channel their energy into becoming part of society's solutions as opposed to being the problem.

OP-248

**The Determinants of Innovation in Malaysian Food Processing Small and Medium Enterprises (SMEs)**

*Suziyana Mat Dahan, Ahmad Nazif Noor Kamar, Rabiatul Syuhada Hasan, Nurhaizan Mohd Zainudin, Fadzida Ismail*  
*Universiti Malaysia Pahang*

Innovativeness of a new product and Small and Medium Enterprise (SME) innovation capability is important to present opportunities for SMEs in terms of growth and expansion into new areas as well as allow SMEs to gain competitive advantage. Realising the essential contribution of food processing SMEs towards Malaysia' economic growth, various incentives and assistance formulated by government to stimulate them to become more aggressive in undertaking innovative activities. Such innovation initiatives are driven by various factors such as changes in consumers' preferences, technological change, research and development activities, skills of workforce and many more. This paper discusses the innovation successfulness among food processing SMEs in Pahang, Malaysia. It aims to study the factors which determine innovation activities in food processing SMEs and which of them are the most influencing one. The key factors studied were identified as firm culture, firm innovation management, experience with innovation, appropriate resources allocation, and freedom to innovate. The respondents involved were 85 SME's owner, who had been approached through survey. By using Statistical Package for the Social Sciences (SPSS), the result obtained by finding the mean value for each of the item assessed. Results revealed that the appropriate resources allocation is the most influencing determinants of innovation successfulness among food processing SMEs. Two main firm's resources; time and money found to be the major aspect in business field which needs to be managed systematically and properly. The findings are mainly benefited the SMEs owners and related government agencies in restructuring the strategies towards more efficient innovation adoption and implementation.

OP-249

**Entrepreneurial Capabilities of Sama College Students of Dezful Branch**

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Since students in higher education institutions, after graduation are entered in unstable environment, thus the importance of using of knowledge learned has a special position. Training is one of the most important aspects of entrepreneurship which has been discussed. Studies have proven that characteristics of entrepreneurs are most acquisitive not hereditary. It is noteworthy that how students entrepreneurial ability and effectiveness of entrepreneurship courses at universities on students achievement and insights of creating innovative business can be measured and evaluated. The study aimed to investigate the entrepreneurial capabilities of students of SAMA college DEZFUL Branch in 2011, and is a survey. The results indicate that entrepreneurial capabilities of students is higher than average and no significant difference in the capabilities of SAMA college students were observed. It was observed that the entrepreneurial ability of the students of physical education is higher than other students. Therefore, it is suggested that teachers use new methods in teaching entrepreneurship course, increasing short periods which affect entrepreneurial spirit and entrepreneurship courses be designed for higher level in universities, meanwhile, authorities, pay particular attention to practical training from pre-school periods.

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OP-250

**Investigating the Relationship between Emotional Intelligence and Entrepreneurship Development ( A Case Study: Senior Students of Agriculture, Ilam Branch, Islamic Azad University)**

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Ilam Branch, Islamic Azad University

The aim of the present study was to investigate the relationship between emotional intelligence and entrepreneurship development of senior students of Islamic Azad University of agriculture. According to the aim of this research it is an applied study, according to its issue is descriptive, and based on the nature of the research is correlation. The population of this study is all senior or University master of degree students of agriculture field (N=80). All of these students were considered as the study sample. In order to collect data, the Travis Bradbery & Jane Grevs emotional intelligence questionnaire was used (2005). For collecting data of entrepreneurship development a researcher made questionnaire was used. The face and content validity of research instrument were confirmed according to panel, of scientific community for training and promoting agriculture and business management of Ilam Azad University. In order to determine the research instrument pre-test was conducted, that the mean measured Alpha for different parts of questionnaire was 0.82. The collected data was analyzed by spearman and regression correlation coefficient. The results of this study shown that there is a significant relationship between emotional intelligence (self awareness, self management, social awareness and relations' management variables) and entrepreneurship development among senior students of Agriculture University, with % 1 level of confidence. Also, the results of stepwise multiple regression analysis shown that four independent variables of the study specified 92.2 variance of entrepreneurship development variable. In dimensions of emotional intelligence, relations' management variable have the most influence to predict entrepreneurship development variable.

OP-251

**Entrepreneurship Approach and Incentives Given in Turkey, United States and Europe**

*Faik Çelik<sup>1</sup>, Ayfer Özmen<sup>2</sup>*  
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In this study, the issue of financing of entrepreneurship is discussed. While the issue is examined, Turkey and U.S. are reviewed separately and their differences are tried to be highlighted within here. Also, the financing for entrepreneurship is overemphasized in three different practices. In addition to financing of entrepreneurship, the importance of incentives to be given and other supports are urged upon as well. The countries provide financial assistance to small and medium-sized enterprises (SMEs) in different forms. They are available in different forms such as grants, loans and, in some cases, guarantees. Support is available either directly or through managed at national level. SMEs can also benefit from a series of non-financial assistance measures in the form of programmes and business support services. In this study are examined Turkey, Europe and United States of America.

OP-252

**Sources of Financing and R&D Investments in High Technology New Ventures**

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This study examines how different sources of financing (i.e., formal and informal) affect R&D investments in the context of high technology new ventures. Although formal financing sources such as banks and other credit institutions provide new ventures with large amount of financial capital, they also directly or indirectly restrict the use of these funds. For example, banks require certain interest payments at specific times, require collateral, and other obligations, which would limit the ability of new ventures to engage in risky

strategies because if new ventures fail to meet their obligations to these formal financial institutions, their survival is at risk. Therefore, new ventures with formal sources of financing would be more cautious and less likely to invest in R&D projects that are inherently very risky. Financing from informal sources such as friends, family and angel investors, on the other hand, may allow new ventures to act more flexibly. Informal resource providers do not subject new ventures to restrictive financial controls. They usually do not care as much about the specific use of those funds or the specific due dates when they will be paid back. This, in turn, may provide new ventures with more freedom to experiment, and invest in R&D projects. I test these hypotheses using data from the Kauffman Firm Survey on 2,424 newly founded new ventures in the U.S. I also get additional insight from my qualitative data gathered from high tech entrepreneurs. The data lend support for the claim that where entrepreneurs get money from significantly influence their propensity to invest that money in R&D activities. This study has important implications for policy makers seeking to encourage innovation-based entrepreneurial economy.

OP-253

**"The Interdependency of Global Financial Markets and the Heightened Systemic Risk"**

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It all started with the collapse of communist bloc in late 1980s and the new global system was redesigned accordingly with Brady's and Baker's plans pushing for privatization of non-developed parts of the world. Clustering of emerging countries in accordance with the pace of technology and internet paved the way for the emergence of new financial instruments, structured finance products and the hunt for yield. In our contemporary global life through advancements in technology and by the development of mankind and civilization, financial markets across the world have become deeply integrated. The breakthrough internet technology fueled the macro growth models and arbitrarily extrapolated the total factor productivity while as convergence among various cultures defining different geographic regions failed to catch up with it. Therefore shocks from different regions had unintended consequences on policy reactions.

A recent example can be shown in the divergence of US Treasury yields from Federal Funds Target Rate and probably in today's market pricing of the US Treasuries in contrast to the expected FED rate hike. A reason can be discussed by historically depressed yields in Euro Area and Japan (Developed World's biggest economic areas) and the coupling/de-coupling idea behind it. General yield compression may be a reason for deviation and the need for rebalancing of world order. In this research we are evaluating benchmark treasury yields using the method of co-integration and reach conclusive results that even a tightening cycle that may be initiated by Federal Open Market Committee may fail in Treasury yields following suit.

OP-254

**Do Muslim Countries Have Higher Islamic Banks Competitiveness? Analysis of Islamic Banks in Indonesia**

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This paper examines the competitiveness of Islamic and conventional banks in Indonesia. We construct Lerner index to measure competitiveness by estimating trans-logarithm cost function. We use quarterly data from top five Islamic banks and conventional banks in Indonesia over the period 2009-2013. Several interesting results are generated in this paper. First, we find that Islamic banks are still less competitive compared to conventional banks. The assumption that Muslim country benefits Islamic banks to have higher competitiveness is not supported in this study. Thus, this paper enriches the previous literature by providing the evidence that Islamic banks are not more competitive than conventional banks even in a biggest Muslim country in

the world. Second, we also observe that size of banks do not have significant relationship with bank competitiveness. This supports previous literature which claims that structural-conduct-performance theory is no longer appropriate to assess bank competitiveness. Third, we find that loan and equity proportion have negative nexus on bank competitiveness. This last result indicates that conventional banks which have higher equity and higher loan do not favor their competitiveness in case of Indonesia. Further study about bank competitiveness in a country level and its relationship with country financial stability is suggested in this research.

### OP-255

#### **The Relation between Usage of Credit Card and E-Trade in Terms of Electronic Payments Systems: Case of Turkey**

*Elif Haykar Hobikoğlu*  
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E-trade is the biggest growing industry worldwide. As it gets bigger, ways of payment method gets dimensional. Various ways of online payments methods are still getting created such as credit cards, debit cards, paypal, bitcoins, on the door payment and etc.

In this report credit card usage will be analysed year by year between the all possible methods during e-trade.

### OP-256

#### **Does Financial Innovation Lead up to the Crises ? Samples of the Major Financial Crises**

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Financial innovations have many significant positive effects. For example financial innovation can contribute to the economy for picking up. However there are some studies that have discussed the financial innovations have a dark side. Financial innovations sometimes create complexity and actors in the financial sector can not correctly evaluate the risk of the new products and services. Because of the recent global crisis started from the point of the mortgage market that have included significant innovations, the thought of the cause of the financial crises are financial innovations was suggested. In this paper, theoretical literature about financial innovation and global crises was researched, major crises have stamped the economy were discussed and whether financial innovation have a share in these crises was considered. The paper develops propositions based on this review and discusses implications to avoid economic crises in the future.

### OP-257

#### **Investigating the Effects of Psychological and Socio-Cultural Factors on the Tendency of Villagers to Use E-Banking Services (Case Study: Agricultural Bank Branches in Ilam)**

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The main objective of this study is to investigate psychological and socio-cultural factors effective on the tendency of the villagers to use e-banking services. The current paper is an applied study considering its objectives. The main data gathering tool in the current study is a made questionnaire which is designed and executed based on the conceptual background of the subject matter and the objectives and hypotheses of the study. The statistical population of this study includes all the customers of rural branches of Agricultural Bank in Ilam Province (N=82885). Among these 120 participants were chosen through sample size determination formula and they were studied using stratified random sampling method. In the analytical statistics level the results obtained from calculating Spearman's Correlative Coefficient showed that socio-cultural and psychological factors had a significant impact of the extent of the tendency of the villagers to use e-banking services of the Agricultural Bank at the 99% level. Furthermore stepwise multiple regression analysis showed that both sets

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of psychological factors as well as socio-economic factors were able to explain 50 percent of the variance of the independent variable; namely the tendency of villagers to use e-banking services.

### OP-258

#### **Microfinance and Poverty Reduction: A Review and Synthesis of Empirical Evidence ✳**

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We examines the relationship between microfinance and poverty reduction at the macro-level, using cross-country and panel data of 1132 microfinance institutions in 57 developing countries. Taking, account of the endogeneity associated with MFIs' loan.

We show that a country with higher MFIs' gross loan portfolio per capita tends to have lower levels of poverty indices and higher level of expenditure of consumption per capita, confirming the role of microfinance in poverty reduction at the macro level and that poorer countries need to focus more on the equalizing effects of microfinance.

### OP-259

#### **Socio-Cultural Dimension of Innovation ✳**

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Determined by many factors such as existing cultural conditions, innovational capacity is one of the critical dimensions for economic development. Therefore, by analyzing the factors that promote or constrain the innovational capacity of a society could benefit the economic and social welfare. For the very reason, in this paper, we tried to assess the role of culture in determining innovational capacity of a society, since it is believed that the culture is matter in terms of improving the innovational capacity of a society. For this purpose, we employed Hofstede Index, which is used to measure cultural differences across countries to explore the relationships between culture and innovation. Moreover, inasmuch as innovational capacity is crucial for economic development, we need to consider these questions: could we improve the innovational capacity of a society? If yes, what are the strategies or methods to do it? Although formation of a culture supporting creativity or learning to be creative is tough issue, many scholars claim that it could be learned by following some strategies Therefore, one may conclude that creativity is a skill that can be developed and a process that can be managed.

### OP-260

#### **The Impact of Microfinance on Poverty Reduction: Empirical Evidence from Malaysian Perspective ✳**

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Microfinance became a buzzword in the credit markets as an effective tool for poverty reduction and socioeconomic development. Yet, the impact still questioned and varies from one country to others and from urban to rural.

The aim of this paper was to examine the role of Malaysian microfinance; Amanah Ikhtiar Malaysia (AIM) on household income. A cross-sectional survey interviewed 780 from old and new clients in Selangor and Melaka states in Malaysia. The stratified random method was used to collect the data from urban and rural districts. The poverty line income was widely recommended to be used in measuring the impact of microfinance on household level to name. In this research, dependent variable is household income which was coded categorical according to Malaysian poverty line income (PLI) namely extreme poverty (households with monthly income equals or below RM 440, poor (households with monthly income equals or below RM 750 and finally low

income (household with monthly income equals or below than RM 2000. In line with this study, the Malaysian microfinance has positive impact on women household income especially in rural areas. The result of this study highlighted on the important of other control variables that have positive impact on women household income. For instance, access to business training has positive impact on women household income. This indicates that women with knowledge about business are more able to make profit and enhance their business revenue. The finding of multinomial logistic reveals that AIM has positive impact on household income of women borrowers who spent three years in the scheme as compared to new borrowers who have not received treatment.

OP-261

**The Influence of the Multi-Stakeholder Governance in the Performance of Cooperative Banks: Evidence of European Cooperative Banks ✱**

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Compared with the commercial banks, cooperative banks remained relatively unscathed during the 2007's crisis. In this paper, we look for possible explanations as to their first-rate performance. To this end, we analyze the past and present indicators of the cooperative system, particularly in terms of internal governance's mechanism. Our sample is composed of a number of European banks which has attempted to study the presence of an impact, affected by the new governance of cooperative banks, on their performance. It has been revealed that, differing to previous research; members of the cooperative banks have a negative impact on performance. However, our study showed that the law of membership may be the fundamental cause for its performance.

OP-262

**Computer-Based Human Reliability Analysis Onboard Ships ✱**

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Human performance monitoring has become a core matter of maritime industry since the crew error ratios cannot be reduced to the desired level. This study develops an approach to conduct human reliability analysis via knowledge-based system in order to minimize the operational problems that may arise from human errors on-board ships. The model base of the system takes the advantage of human error assessment and reduction technique (HEART) which is robust tool in reliability assessment. The main role of programming language in the system is to transform operational task scenarios in database into meaningful information to quantify two key parameters (i.e. GTT, EPC) sensitively. The system is expected to support shipboard organizations to monitor, identify, prioritize and implement the remedial measures to mitigate the human error in ship operational level. In consequent, the study has both methodological and practical values in knowledge based systems and ship operations modelling.

OP-263

**Security Type Comparison in Service Oriented Architecture Security ✱**

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Nowadays more effort has been spending on combining subsystems to form larger systems such as enterprise information management systems rather than simple database management systems. The security of the enterprise system emerges as a growing problem besides the difficulty of the creation of complex systems. One of the major adversities is the wideness of the system coverage area. Especially the concept of cloud computing introduced the notion of

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coverage without strict borders. The security of this notion also is a research topic. In this study, the security mechanisms and properties of web services as well as the usage areas are explained.

OP-264

**Hadoop Ecosystem and its Analysis on Tweets ✱**

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Hadoop is a Java based programming framework for distributed storage and processing of large data sets on commodity hardware. Hadoop basically has two main components. First part is Hadoop Distributed File System (HDFS) for distributed storage and second part is MapReduce for distributed processing. HDFS is a file system which builds on the existing file system. HDFS provides scalable and reliable data storage on commodity hardware. A master/slave architecture is used by HDFS. In this architecture, it has a single NameNode and more than one DataNodes. The NameNode manages the file system and stores the metadata. It acts like a file manager on HDFS. Because all files and directories are represented on the NameNode. DataNodes stores the part of data. A file is splitted into one or more blocks (default 64MB or 128MB) and that blocks are stored in DataNodes. MapReduce is a programming model which is used for processing and generating large data sets with a parallel, distributed algorithm on a cluster. A MapReduce job's first step is the mapping of data set in MapReduce architecture. The framework sorts the outputs of the mapping process, which are then input to the second step (reduce task). Input and output of the job are stored in a file-system. The MapReduce framework consists of two process which are JobTracker and TaskTracker. The JobTracker manages the resources that are TaskTracker. The TaskTracker is a processing node in the cluster. It accepts several tasks like map,reduce and shuffle from a JobTracker. Twitter4J is an unofficial Java library for the Twitter application programming interface. It is an integrated Java application with all Twitter services. This paper focuses on Hadoop, its ecosystem, and implementation for analyzing collected tweets. The analyzed results are represented as graphical charts which are shown on a web page.

OP-265

**Privacy Preserving Secure Online Advertising ✱**

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Online advertisement has generated 48.09 billion dollars in 2013 (IAB, 2014) in US sponsoring most of the free services and content on the Internet today. However, problems stemming from the rivalry to get a share of this high revenue can disrupt the system jeopardizing online privacy and security. There have been a lot of malicious cases where fraudsters have deployed methods such as malware or phishing to get a share from the market thus compromising the security of end users and thus harming the end users. In addition to this, tracking methods deployed to increase the targeting accuracy of the advertisements reveals a lot of private information about the users without any permission from them. The rules around collection and usage of personal data is ambiguous and can be harmful in various ways such when it is shared with third parties. In response to these threats, end users have been inclining to use ad-avoidance tools which disable user tracking or block ad requests completely. This situation harms the Internet ecosystem which heavily relies on online advertising. To remedy this problem, Comodo is developing secure and privacy-friendly advertising solutions around its "trusted ads" concept using methods such as anonymous user tracking, safe ad content delivery and continuous ad inspection (malware/virus scanning). These methods guarantee secure advertisements delivery to end users, while preserving effectiveness of ad delivery. The beta versions of the products have been deployed and tested in real life for 6 months. Based on our observations, users are concerned about their privacy; but they also want customized content according to their needs and make money from ads as long as it is not harmful to them. Based on this data, we are willing to expand our system and make it one of the major ad-delivery networks.

OP-266

**Fire Detection Systems in Wireless Sensor Networks \***

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Natural disasters have increased due to man recently being senseless and with the effects of the damages they caused on the environment. These factors which negatively affect the ecosystem in the world have been noticed and the hitches are wanted to be prevented. As known, fires are the leading of these disasters. Most of the fires are triggered by the environmental causes even though a minority of them are self-triggered. To prevent fires many different safety systems have been developed. Among these systems, Wireless Sensor Networks stand out with their ease of use and low cost. In this study implementation of systems for keeping track of fires in a certain area with Wireless Sensor Networks has been discussed.

OP-267

**Fuzzy Logic and Dempster-Shafer Theory to Detect the Risk of Disease Spreading of African Trypanosomiasis**

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This research offers some insight on the risk of disease spreading. Integrating Fuzzy Logic and Dempster-Shafer theory by calculating the similarity between Fuzzy membership function in the context to detect the risk of disease spreading of African Trypanosomiasis and finally to develop a realistic and useful Web mapping for displaying maps on a screen to locate the risk of disease spreading. The risk of disease spreading is not classified according to higher density which is equal to higher risk. This research has considered population changes in an area to detect the risk of disease spreading. The experts provide opinion in terms of basic probability assignment for interval or crisp focal elements. Those basic probability assignments are proposed based on the similarity measure between membership function. The similarity between Fuzzy membership function is calculated to get basic probability assignment. The highest percentage of the risk of disease spreading of African Trypanosomiasis is 17 %. In Angola and Zambia, the highest basic probability assignment of the risk of disease spreading of African Trypanosomiasis is very low which is equal to 0.173. The risk of disease spreading of African Trypanosomiasis in areas which include Angola, Botswana, Congo, Congo DRC, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe.

OP-268

**Performance Analysis of Karatsuba Multiplication Algorithm for Different Bit Lengths \***

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In computer arithmetic, multiplication is one of the most significant operations. Multiplication is used in many operations such as division, squaring and computing reciprocal. In addition, the efficiency of multiplication is crucial due to the use of digital signal processing applications such as correlation, filtering, frequency analysis and image processing. Karatsuba algorithm is one of the algorithms developed for increasing the efficiency and reducing the cost in order to simplify multiplication. In this study, the performance of Karatsuba algorithm is analyzed in terms of the number of multiplication and the total process time for different bit lengths.

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OP-269

**2-Head Pushdown Automata \***

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Finite state automata recognize regular languages which can be used in text processing, compilers, and hardware design. 2-head finite automata accept linear context-free languages. In addition, pushdown automata are able to recognize context-free languages which can be used in programming languages and artificial intelligence. We distinguish between deterministic and nondeterministic finite automata, 2-head automata and also pushdown automata. The deterministic version of these machines is such that there is no choice of move in any situation while the non-deterministic version may have a choice of move. The present thesis describes 2-head pushdown automata which is more powerful than the pushdown automata and it is able to recognize some non-context-free languages as well. Throughout the thesis we try to focus on characterization of aforementioned machines.

OP-270

**Real-Time Ride Share Based on Trusted Users for Riyadh City \***

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Traffic jam is a growing problem especially in big cities like Riyadh where people are enforced to ride a vehicle in order to reach their destinations. The need of cost-effective system is increasing in order to reduce the traffic jam impact. Wherever, streets are congested with cars. In the same time, each car's capacity can take up to four persons but this capacity is generally underexploited. If we can take advantage of the free space in each car, this will lead us to its best use with an optimal equation for achieving: fewer cars in the streets with more number of passengers.

In this context, our mobile application "Where are you ?" is proposed as a solution that can help solving traffic jam problem. "Where are you ?" is a real-time application, which connects people living in the same city and having the same travel needs. Users ride-share their cars, based on the GPS position of the requester, the system searches the nearest and available car on the way of the requester. The system provides feedback and favorite driver's features, so that will help others to choose the best available driver. Our system is developed for android phones. It is considered as a social media since it provides communications between individuals or groups. Our application is based on trusted users. Users are authorized to register as part of a university or a company group or validated by their administrator. Registration within a group is available to people with email addresses that end with the group affiliation. A "female only option" is also provided by the system. Our application is environmentally friendly because it provides carpooling service, which reduces carbon emissions, traffic jam, and the need for parking spaces.

OP-271

**Analyzing Generic Network Location Service \***

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Abstract—the main focus of this work is to describe specific fault-tolerance mechanisms which can be applied in a DHT (Distributed Hash Table) technology). We implement device translation solution among different identifications of devices based on the DHT (Distributed Hash Table) technology and present various algorithms ensuring fault-tolerance. Whereas nodes in DHT's are obviously used to store data identified by a single identification key and their possible failures are resolved by approaches of multiple data copies. We assumed the usage of stored value groups - records - for any possible accesses and functions. Records required for any kind of a specific

identification set may be stored in more differently placed record copies in the DHT system. This approach supports the ability to solve failures of specific nodes in the DHT node set without direct multiplication of their storage space. Our solution was based on the DHT Chord implementation and the development of the Generic Network Location Service (GNLS) based on the Chord implementation. The systems of algorithms both proactive and reactive were used to solve a problem of node failures have been developed and compared in this research and selected algorithms have been tested by experimentation and simulations. The provided algorithms guarantee fault-tolerance in the presence of dynamism: they guarantee consistent lookup results in the presence of nodes failing and leaving.

Finally, GNLS results are analyzed. By practical and theoretical verification, it is concluded that reactive algorithms performed better than proactive algorithms in the GNLS framework and solved some of the most important problems of device location identifications.

### OP-272

#### Investigation of the Performance of Nikhilam Multiplication Algorithm \*

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Multiplication is one of the most important operations in computer arithmetic. Multiplication is used in many operations such as squaring, division and computing reciprocal. Moreover, multiplication is a very significant arithmetic operation for lots of signal processing applications which are convolution, correlation, frequency analysis, image processing etc. The efficiency of multiplication operation is crucial for the process time of these applications. Nikhilam algorithm is one of the algorithms developed for increasing the efficiency and reducing the cost in order to simplify multiplication. In this work, the performance of Nikhilam multiplication algorithm is analyzed in terms of the number of multiplication and the total process time for different bit lengths.

### OP-273

#### Factors Affecting Innovation in Nigerian Construction Industry

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Innovative development in the construction industry is on the increase in recent time. Innovation in the industry is a continuous mission for future economic development of any Nation. The emerging technologies and their implications for the daily activities of the construction industry cannot be overemphasized as it enhances the construction output. But the scenarios in Nigeria differs where the industry has been characterized with poor construction output. Therefore, the factors that affect innovation in the construction firms and the practice that encourage the adoption or diffusion of innovation in the industry were identified in the study. By the means of a survey research approach, interviews and questionnaires were used to collect data which was analyzed using descriptive statistics. Innovation attitude, strategic posture and environmental influences affect innovation adoption in the industry. The change of attitude by the construction practitioners towards these factors will diffuse innovation within the sector for total transformation in construction output.

### OP-274

#### Innovative Design of an Axial Blood Pump for Extracorporeal Mechanical Circulatory Support

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Extracorporeal mechanical circulatory support (EMCS) has become a treatment option of choice in refractory heart failure patients as an external mechanical blood pump. Extracorporeal mechanical life support (EMLS), also

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known as veno-arterial extracorporeal membrane oxygenation, providing at the same time circulatory and respiratory support. EMCS may be according to the basic classification divided either non-pulsatile or pulsatile blood flow that may contain tubes, valves, pumps and oxygenators before it is pumping back to patient's circulatory systems.

In the second and third-generation devices, two types of pumping system commonly used as: the roller and the centrifugal pumps. Pulsatile flow is inherently created by roller pumps and non-pulsatile flow is created by centrifugal pumps. Previous research found evidence to support the superiority of pulsatile flow to non-pulsatile flow: lower pulmonary vascular resistance, improved micro circulation and less oedema, improved blood flow to internal organs, lower incidence of systemic inflammatory response, decrease in post-procedure death rate, and no increase in hemolysis or platelet consumption, activation, or dysfunction. Both pumps are known to cause hemolysis and activate blood components through the creation of high flow/pressure areas and elevated shear stresses.

In this work, a new generation, small size, axial pulsatile blood pump design configuration will be introduced for use both EMCS and EMLS, particularly in the practice of cardiology and cardiovascular surgery. The pump which is the "shaftless rotor" of a synchronous servo electric motor uses the direct drive technology. The pump is rotating in a magnetic field and can provide adequate blood flow with relatively lower rpm. Moreover, the speed of the rotor rotation will be controlled by a microprocessor, based on the synchronized signal of the electrocardiogram (ECG) received from the patient in real time. The results from the CFD showed lower turbulence and shear forces promising new technology for replacing the current pumping system.

### OP-275

#### New Empirical Evidence: If Considerably Modified, Lean Management, can Substantially Increase Performance in Healthcare

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The study reports how a healthcare organization was able to improve its performance in a seminal way by means of a transformation process that took less than three years. Before the transformation only 18 percent of patients received care in the required time; after the transformation 98 percent of patients received care as required. These figures are just one but an indicative measure of the improvements made. Even better, the improvements were made while costs were decreased. What is the secret behind such remarkable improvements in performance? The results were recorded from an extensive experiment of applying lean management in a healthcare organization.

Lean management has originally been developed to increase productivity in industry context but in this study empirical evidence of applying the lean management principles in healthcare was gathered. The objective of the study was to provide new evidence of the applicability of lean management in healthcare organizations. The first sub-objective was to identify and quantify performance effects that the application of lean management can have on healthcare organizations. The second sub-objective was to give new insight on how the traditional lean management principles need to be modified when lean management is applied in healthcare organizations, instead of applying them in industrial organizations. The case organization in the study was the Children's Castle in Helsinki, Finland, that consists of specialized pediatric outpatient clinics and wards.

The study concludes that extraordinary improvements can be achieved in performance of healthcare organizations by means of applying lean management. However, in healthcare the lean management principles cannot be applied as such but they need to be modified. Important is to deeply understand the lean philosophy and to carefully modify the individual tools that constitute the lean management.

OP-276

**An Overview: Co-Combustion Characteristics of Coal and Oil Palm Biomass Blends Via Thermogravimetry Analysis**

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Electricity production is fossil fuel dependent. In fact, direct combustion of biomass including oil-palm and rice residues has generated high electricity capacity in Malaysia. Oil palm frond (OPF) is one of agricultural residues which found abundantly and being utilized as feedstock for ruminants in a minor proportion. In terms of environment sustainability and economic, biomass is considered as clean and has carbon-neutral properties. However, due to high moisture content, low energy density, hygroscopic behavior and poor grindability of raw biomass, torrefaction process is found to be an effective process to improve the properties of biomass. Torrefaction or mild pyrolysis is a pre-treatment carried out at the temperature of 200-300°C in an inert atmosphere purposely to convert biomass to solid fuels. Meanwhile, biomass pyrolysis is a strong thermo-chemical method carried out at temperature range between 350-600°C in inert atmosphere producing bio-oil. There are several torrefaction parameters which affect combustion of torrefied biomass in terms of physical and chemical properties. These include residence time, heating temperature as well as char yield. Moreover, it is essential to optimize torrefaction conditions in order to achieve stability, and high quality of solid fuel. This paper aims to analyze the studied torrefaction parameters conducted by previous research in order to determine the optimum conditions of torrefaction process. It is vital to study thermal behavior of biomass and coal and their interaction in order to predict the behavior in a real combustion system. This paper also aims to discuss the physical and chemical characteristic of biomass and coal, combustion performance, effect of blending coal and biomass in co-combustion as well as effect of heating rates on combustion characteristic. From the study conducted, renewable energy such as oil palm biomass has a great potential to replace or add together to coal for energy production purpose.

OP-277

**An Approach to Life Expectancy of a Product/Service for Sustainability of Supply Chain Management Systems**

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Sustainability is closely related to the concept of development that meets the needs of the present by ensuring the ability of the future generations to meet their own needs. Sustainability has become an important issue for management systems, scholars and practitioners. This concept is very vital for our social life. For example, Life expectancy, serviceable life for a product as sustainability of. It is really significant for humanity, ecological life and also product design, supply chain management systems. Planned obsolescence (Decreasing lifespan of a product) is the practice of limiting the life of a product; later on manipulating customers buying behaviour, to benefit the manufacturers. A product that has been made with poorer or weaker materials so that it will last a predetermined length of time. Planned obsolescence is common in many different products.

The purpose of this study is to gain knowledge and understanding of the theory behind obsolescence, decreasing lifecycle of a product or service and it aims to understand the broadness of the subject and to create a vision for consumer durable goods per household and how it can be extended to work well with a more continuous approach to consumerism.

OP-278

**Quality Oriented Assessment for the Integration Structure of Manufacturing Steps in Textile Sector**

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The basic and the most vital problem in the firms within the scope of manufacturing and services is the sustainability factor of production quality and sustainability of quality.

In this study, to determine the best strategy and the development of the textile sector to assess this business and will be focused via an industrial engineering perspective. All stages of this industry will be included. In this basic sense, the textile process has a series of steps between fiber and knitting. Dyeing, printing and confection steps will be the matter in hand. Generally, The textile sector is selected as a vital research subject in order to sum up for mankind in general and also in Turkey.

The other purpose of this study is to describe its strengths and weaknesses.

OP-279

**An Energy Efficient and Innovative Cryptographic Technique in Health Information System Using Ancient Indian Vedic Mathematics to Improve QoS**

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Providing Security with effective key generation technique is the basic service for Body sensor network (BSN) security. The essential services such as Authenticity, Integrity and Confidentiality are to be achieved effectively and efficiently with the optimum resource utilization. Further, the security mechanism is to be established in strict accordance with the operational requirements of the healthcare and operational constraints of BSN. In this paper, the novelty in the utilization of ancient Indian Vedic mathematics particularly the sutra UrdhwaTiryakbhyam applied in the context of Elliptic Curve Cryptography (ECC) to provide security for health information system. Further, the problem of most time consuming processes in ECC encryption and specifically the modular exponentiation computation is also addressed to minimize the computational time in this paper. From the performance analysis, it is demonstrated that the Vedic Mathematics based ECC for BSN exhibits an excellent performance in security services with an extremely low-power and low-memory cost.

OP-280

**Virtual Reality Innovation for Using Automotive**

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Virtual technologies are increasingly used nowadays in response to the rising number of equipment and model variants in the vehicle design and development process. The use of virtual technologies means that a considerable number of variants can be shown, modified and assessed at a very early phase of the process, thereby reducing the time and costs required for the overall process. The VR application is developed based on real-world CAD data, then processed using 3D modeling software, and implemented in IT. Despite these display options, real hardware models continue to be used in preference over virtual data in many of the process steps. The reason for this is that forms, curves and geometries can be assessed more effectively using a vehicle model in reality than via a purely virtual display, particularly because virtual data is shown on conventional displays such as a monitor, where data is often scaled down in size and is not an accurate reflection of reality. Even if virtual data is shown in the correct ratios, many developers note that their perception of the data is skewed. Therefore, perception of size in virtual data continues to present

a challenge and is an issue currently being researched. In this paper, we discuss our experience in developing a real-time Virtual Reality (VR) application based on given real-world CAD data. The VR application displays an automotive company in Turkey.

**OP-281**

**Data-Driven Financial Management for SME Growth**

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SMEs account for 99.8% of Turkish businesses and 76% of employment, but they are only one third as productivity as larger enterprises. A World Bank study cites lack of technology adoption, management know-how, and access to finance as major obstacles to SME growth. Paraşüt, a software-as-a-service (SaaS) startup, tries to solve all three problems for Turkish SMEs through a powerful yet easy-to-use financial management application delivered affordably through the cloud. In this talk, we share case studies of the enormous efficiency gains such SaaS applications make for SMEs.

**OP-282**

**Innovations, Economic Growth and Intellectual Property Rights in China**

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It is well recognized phenomenon that innovations are a strategic weapon for economic growth and have played an important role in industrialization process of developing countries. According to Global Innovation Index Report (2013), China has been ranked 35 out of 142 countries and economies. Over last 30 years, China has made tremendous progress in producing innovated goods. In this paper we would thoroughly discuss the case of Haier Company. Haier is one of the very successful stories of Chinese companies which absorbed the foreign technology and climbed up the technological ladder. The case of Haier supports our notion of innovation philosophy behind the success of Chinese companies. Furthermore, the issue of property rights in China would also be analyzed in detail. As the issue of property rights is at the forefront of the globalization of markets especially in the form of TRIPS under WTO. Intellectual Property Rights is divided into two categories: Industrial property, which includes inventions, trademarks, industrial designs, and geographic indications of source; and Copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs. In this paper we would also thoroughly discuss the evolution of Chinese IP system, the reasons of weak IP regime in China, international conventions of IP involving China, the efforts of China for the effective enforcement of IP rules. Furthermore, we would also discuss the reservations of China as a developing country against IPRs. It is stated that TRIPS under WTO is creating strong inequalities between developed and developing countries as it gives licensed monopolization to developed countries.

**OP-283**

**Entrepreneurship and Economic Performance: A Macro Perspective Abstract**

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The present paper provides a theoretical framework of the relationship between rate of entrepreneurship and national economic performance. Production of goods and services by SME's has vital importance on the economic performance of GDP, on the other hand there is a strict linkage between entrepreneurship and SME in this context the quality of entrepreneurship culture determines the SME's quality. Therefore, economic performance of the nation has been affected by these two factors.

The first part deals with some aspects of the recent economics literature on the relation between entrepreneurship and small business, The further part of the paper has focused on relationship between economic performance and entrepreneurship and also effects on macroeconomic performance.

**OP-284**

**R&D Defense Expenditures and Economic Growth in High Income OECD Countries**

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It is assumed that one of the determinants in increase of total factor productivity is innovation and validity of this hypothesis is still commonly tested. An indicator of innovation is R&D expenditures. The effect of R&D expenditures on economic growth and total factor productivity is analyzed through various economic growth models. Developed and developing countries make some part of their R&D expenditures on defense sector as R&D defense and military expenditures. For example, for the year 2012 USA used 55% of total R&D expenditures in order to improve defense industry.

This rate is around 15% in USA. From this point, analysis of R&D defense expenditures on economic growth, development and output productivity is important to determine "productivity of R&D defense expenditures".

In this study, direct and indirect (external) effects of R&D defense expenditures on economic growth and output analyzed through Feder-Ram model for High Income OECD countries. Moreover, relationships of R&D defense expenditures with economy and other innovation indicators was investigated through panel data and dynamics panel data methods. Stationarity of annual data of R&D defense expenditures and innovation indicators which cover periods of 1996-2012 was analyzed by using the first and second generation unit root tests. Firstly, equations of economic growth and Feder-Ram model were estimated, then short run relations were analyzed with causality tests and long run relations were analyzed by using dynamic and non-dynamic panel data methods such as panel co-integration. In the study, it is expected that direct and indirect (external) effect of R&D defense expenditures on economic growth and output would point out positive relationships.

**OP-285**

**Troubled Economic Transition and Entrepreneurship Development in Bosnia and Herzegovina**

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This paper analyzes difficulties that entrepreneurship faces during a transition process on a particular case of Bosnia and Herzegovina. In context of Bosnia and Herzegovina, transition meant not just changing from central planned to market led economy, but also a transition of lapsed post-war social and political system into a modern European democracy. Plenty of non-functional and inefficient public enterprises, bulky and inefficient public administration, poor availability of financial sources for small and medium enterprises, insufficiency of foreign investments in private sector, widespread corruption and informal economy are only few problems that business community in Bosnia and Herzegovina faces nowadays. In that sense, this paper aims to portrait difficulties that business sector in Bosnia and Herzegovina is facing with as well to identify main obstacles on the path of stronger and more intense entrepreneurship development in Bosnia and Herzegovina.

OP-286

**An Empirical Analyse Relationship Between the Research and Development Innovation and Economic Growth: 1990- 2012**

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Economic growth and development are among the important subjects in macroeconomics. Basic services in a country such as education, health and infrastructure depend on its economic growth and development. It is because of the fact that the quality of these services are core indicators of development. Accordingly, countries have been searching best models for several decades in order to reach healthy and fast growth and development. At the end, the importance of research & development, innovation and technological progress is realized in order to achieve the growth and development.

Research & development, innovation and technological progress not only increase the competitiveness and the productivity but also enhance the quality and the variety of products of countries in the world economy. It is seen that especially the technological development has been taking the place of capital and labor in production process in these days. The share of research & development and innovation in the gross domestic product (GDP) of countries are a great deal in the most of developed countries such as Finland, Norway and United States of America. There is strong relationship between the economic growth with research and development, innovation and technology.

In this study, the relationship of the economic growth of Turkey and the expenditure of innovation, research & development and technology for Turkey will be analysed during the period of 2003 - 2013. Variables will be analysed with Granger Causality Test, Unit Root Test and Regression Test.

OP-287

**Collaborative Orientation as an Essential Dimension of Entrepreneurial Orientation in Agribusiness: Evidence from Albania**

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While the first concept use of the term “entrepreneurship” relates to the seventeenth century in France, the research on it has its beginnings in the twentieth century, as the concept was linked with the innovativeness of businesses. The research focus in the beginning was on settling the relationship between entrepreneurship and country development and after it moved on identifying the factors that promote entrepreneurship. The studies on Entrepreneurial Orientation since the 1980s have increased due to its recognition as a critical success factor of businesses. Up to now the research has measured entrepreneurship by using some or all of the dimensions of: innovation; pro-activeness; risk-taking; autonomy; competitive aggressiveness. This research paper takes the focus on a new dimension for measuring entrepreneurial orientation, that of collaborative orientation. The data used in the study are collected through the questionnaires distributed to 107 agribusinesses in Albania. The methodology used for the analysis of the data is multiple regression analysis. The analysis revealed that collaborative orientation is an inevitable dimension of Entrepreneurial Orientation that needs to be implemented in the further studies of researchers.

OP-288

**The Validity and Reliability of Handball Game Module Based on Teaching Games for Understanding (TGfU) Method for Future Physical Education Teachers**

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This study aimed to assess the validity and reliability of handball game module based on Teaching Games for Understanding (TGfU) in Physical Education. This module is built based on Bunker and Thorpe Model (1982) which includes all the handball skills. The module content is also processed to meet

the requirements of the syllabus in the Secondary School Curriculum Standard (KSSM) which will be implemented in 2017. A total of N = 31 Physical Education teachers samples are used in order to obtain the reliability. The findings show that the validity of the content of the handball game module is  $r = .81$ , while the reliability of handball game module is  $r = .77$ . The agreement percentage between examiners (interobserver agreement) of the handball game module is 70.11% (SD = 0.57). Based on the findings, the handball game module based Teaching Games for Understanding (TGfU) method is suitable to be used as a standard teaching and learning tool for Physical Education subject for Secondary School Curriculum Standard(KSSM).

OP-289

**Enhancing Learning Through Technology**

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The promotion of ICT use in the Algerian Secondary Schools as well as Universities started in 2004. It is required that equipment with data-logging equipment must be available in the classrooms so as to contribute, to enhance learning and teaching English as a foreign language. The use of ICT helps teachers to facilitate their job in the classroom as well as participates in making lessons more objective, attractive and efficient. In this paper, on the basis of the data we have collected from the majority of EFL teachers through questionnaire, we might deduce that using ICTs impel and motivate both teachers and learners to get access to success in their autonomy and willing when doing duties and activities in terms of getting a wide range of instructions and language forms to be in contact with society. It becomes very useful and beneficial by individuals everywhere because it helps them engage in various social, cultural and scientific activities and then prepare them for the professional life.

OP-290

**A Test Model Proposal Based on Evidence for Turkish and Socio-Cognitive Approach in Studies on Validity of Language Skill Tests**

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Common European Framework of Reference for Languages (CEFR) (2013), with the detailed criteria given in its content, is foresaw that it is imperative to develop new applications and techniques both in the interpretation and evaluation of the required language skills, and has redefined the concept of proficiency language levels based on threshold level criteria. These levels include comprehension, speaking and writing skills for the individual use of language. On the other hand, in the content of this frame measure-assessment principles to be applied in language exams are also included. So nowadays in the works carried out for language test developments to achieve results which are accessible and can be controlled, these principles has become essential to focus on. It seems that some theoretical evolutions is to be at the forefront in studies on accuracy of language tests (Alderson, Clapham & Wall, 1995; Bachman & Palmer, 1996; Milanovic, 2002; Weir, 2005). Socio-cognitive approach also offers a holistic perspective in redefinition and the validity of reasons for macro components (context validity, theory based validity, grading validity, consequential validity and criterion-related validity) which are important in the validity of the tests. The socio-cognitive approach his quite functional in testing the validity of pre-developed language skills in before (a priori) and after the experiment (a posteriori) stages (Weir, 2005).

In this study, in the framework of socio-cognitive approach, a suggestion for an evidence-based model for Turkish language skills tests (for preparatory class students of High School of Foreign Languages of Kyrgyzstan-Turkey Manas University) is put forward by anticipating that it is possible to develop a higher level of validity for Turkish language skills tests. The reliability and validity analysis of the tests prepared within this suggested-model was carried out using multivariate statistical techniques. As a result, it was seen that the values of the reliability and validity of the tests meet the expectations.



OP-291

**The Impact of Entrepreneurial Competencies on Pre-Service Teachers' Innovative Behavior**

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This research aimed to investigate the effects of entrepreneurial competencies on pre-service teachers' innovative behaviour. Respondents consist of 560 pre-service teachers in Malaysia Institute of Teacher Education. The survey research design has been engaged in collecting data in the development of the entrepreneurship competency and innovative behavior measurement model. Questionnaires and the basic entrepreneurship test were used in this study as instruments. Entrepreneurial competencies was measured using questionnaire which was developed by researcher. The level of the entrepreneurship basic knowledge was analyzed using the fundamental entrepreneurship test questions. Innovative behavior was measured using the adapted instrument developed by the Messmann & Mulder (2012). Innovative behaviour consists of four constructs, namely opportunity recognition, idea generation, idea promotion, and, idea realization. The data was analyzed using the descriptive statistics, Pearson's correlation coefficients, regression analysis and confirmatory factor analysis. Meanwhile the pre-service teacherpreneur model was analyzed with Structural Equation Modelling, by compiling all the constructs that involved in this study. This research found that the IPG's pre-service teachers adheres a good entrepreneurship basic knowledge. The direct effect analysis revealed that the entrepreneurship competency had a significant direct effect toward innovative behavior. This shows that the entrepreneurship competency are the critical aspects that need to be emphasizes in nurturing the innovative behavior. Hence, the models developed from this research could be applied in strengthening teacher education's training particularly in fostering the innovative pre-service teachers in Malaysia.

OP-292

**Moving Learning Out of Class Through Web 2.0**

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The technology age through which all individuals are going has indispensably shaped our lives. Language learning is bound to have been influenced by those innovations all over the world. Websites, educative applications on smart devices, distant education programs, virtual learning concepts and such innovations replaced traditional teaching. On the other hand, due to some constraints such as resistance to innovation, lack of finance or indifference to technological development, public schools in Turkey have fallen behind with tracing and integrating technology into their education curriculum. Even if most of the teachers possess technology in their pockets, they usually fail to make use of it in or out of the class. In this study, two samples of integrating Web 2.0 tools into teaching English will be shown. One of them is edmodo.com which has 48,210,024 members recently all around the world. This website was founded in 2008 for educative reasons. This website is used in researcher's university, a public university, as an out-of-class teaching and practicing tool. The second website is ayemyu.com which was set by the researcher to enable the language learners to generate the target language in an authentic environment. In this website the instructors and the students create personalized materials which also aim to practice the subject taught in class. The materials are created or discovered by the learners, edited by a voluntary team of learners and published on the website. After publishing, the other learners are encouraged to post comments regarding that material and a virtual learning environment is created so. These two applications are not too original but they show a simple and effective way to use Web 2.0 tools in a learning environment in a public university.

OP-293

**Emotional Intelligence Analysis for Managers of Firms and Effects of firms' Characteristics on EI: Adana Organized Industrial Zone Example**

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Emotional intelligence refers to individuals' abilities such as common sense, good communication skills, understanding of humanity, kindness, grace, politeness, etc. Today, it is very important for individuals to have emotional intelligence and be able to use it effectively in their business life and in relationships within the society. Firms in Adana Organized Industrial Zone (AOSB) performs important duties to produce and distribute products to the receivers in-time. Therefore, the emotional intelligence level may be significant factor in their business. This study investigates the relationships between usage patterns in and characteristics of firms and emotional intelligence of business managers, using dimensions such as "Self-motivation", "Self-awareness", "Self-regulation", "Social-Skills" and "Empathy" in AOSB. The findings of this study may be utilized to enhance the skills of managers in firms in AOSB and, hence, improve the quality of their business.

OP-294

**The Change of Leadership Attitude**

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The rise of science based industries in Europe at the end of the 19 the century or the consolidation of American industrial leadership during the post WWII emphases the importance of science based industries. And with the rapid growth of Asian NICs, countries are supposed to manage complex electronics based technologies. These science based technologic progress make change the understanding of leadership fundamentally.

OP-295

**The Impact of Socio - Cultural Factors on Female Entrepreneurial Intention: The Case of Algeria**

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Entrepreneurship is seen as a necessary ingredient for stimulating economic growth and employment opportunities in all societies. SMEs account for a wide share of economic activity and development; they are the primary engine of job creation, income growth and poverty reduction. Indeed, government support for entrepreneurship is a strategic option to foster economic growth and females' input, in this regard, is of equal significance not only for employability and productivity, but also to narrow the gender gap created by social attitudes and beliefs. The study aims to investigate the impact of culture and tradition on women entrepreneurship in the Middle Eastern and North African countries, specifically in Algeria. It also explores the incentives and constraints that women face throughout their entrepreneurial activities in the Arab region.

Based on the analysis of information from secondary resources, different studies investigated how women are engaged in entrepreneurship. For instance, the findings reveal that women's incentives to start new ventures are summarized in independency, personality traits, economic support, education, experience and family entrepreneurial background. Besides, the study of literature showed that gender inequality, culture, tradition, lack of training, education, financial, management, business and government support are critical constraints that face women.

There are three contributions for this study. Firstly, the study helps advance the theoretical understanding of women's involvement in entrepreneurship in the Arab world through borrowing theories of structuration, practice and cultural reproduction from organisation theory and sociology. Secondly, there is an empirical contribution by using mixed methods approach (qualitative and quantitative research) for the purpose of gaining a better understanding of a research problem and build a strong analysis and argument for a future research.

Thirdly, the study holds a conceptual contribution through developing a model for female entrepreneurial process.

OP-296

**Mediator Role of Organizational Innovation in the Relationship between Strategic Human Resource Practices and Intrapreneurship**

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Strategic human resources which is concerned with how the company evaluates the human resources within the long-term plans, has recently begun to enter into the new applications of large enterprises in Turkey. It is accurate that one of the main weapons of enterprises, which wish to seize the competitive advantage based on human, is the strategic human resource practices. While the strategic human resources practices based the competitive advantage to the human resources; investigation about the presence of the other applications related to human resources has been seen as necessary and contributing. Only focusing on strategic human resource practices in research has been seen as not sufficient in terms of the contribution to the field and to put forward other applications related to the human resources.

The relationship between strategic human resources, innovation and intrapreneurship were investigated by different researchers, the results have been achieved separately (Akgün, 2010; Demirtaş, 2013; Cingöz, 2011; Chen, Huang, 2009, Ögüt, 2014; Naktiyok ve Kök, 2006). In our study organizational innovation tendency's mediator role in the relationship between strategic human resource practices and intrapreneurship will be revealed and the findings of study will be contributed to the literature. In other words, while intrapreneurship is seen as a concept which has great contribution in organizational renewal, revival, in obtaining competitive advantage and the dynamism of the organization, entering international markets, ensuring the sustainability; handling phenomenon deal with strategic human resources and innovation tendency will also create diversity in the field.

Hypotheses of the study:

**H1:** There is a positive relationship between intrapreneurship and strategic human resources.

**H2:** There is a positive relationship between innovation performance and strategic human resources applications.

**H3:** There is a positive relationship between innovation performance and intrapreneurship.

**H4:** Innovation performance mediates the relationship between strategic human resource practices and intrapreneurship.

OP-298

**A Research to Examine Linking with the Impact of Entrepreneurship Training Over Entrepreneurship Tendency**

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The purpose of this research is to analyze the effects of the entrepreneurship trainings received by the individuals at entrepreneurship courses on their entrepreneurship tendencies. Within the scope of the research, survey was applied to the 255 persons who were selected by random method from the population group who participated in Kosgeb (small and medium industry development organization) supported entrepreneurship courses in different periods of 2014 in Istanbul.

Scanning model was used in the research; total 2 scales were used to analyze the relationship between the attitude regarding entrepreneurship training and the entrepreneurship tendency. The entrepreneur candidates were given questions which contain personal information. In the statistical analysis of the data, t-test, one-way Anova test and Scheffe test were used. The relationship between the dependent and independent variables of the research was tested by Pearson correlation, and the effect was tested by regression analysis, and the results were interpreted as 95% confidence interval, 5% significance level.

As a result of the research, it was found that the attitudes of the entrepreneur candidates who received training were high and general entrepreneurship tendencies were at medium level; but the keenness level regarding entrepreneurship which is a sub dimension of tendency was too high. It was seen that the attitude regarding entrepreneurship training had an effect on the entrepreneurship tendency but the trainings only remained at keenness level

in revealing the tendency of training. This shows that it is unavoidable to reanalyze entrepreneurship trainings and make some adjustments.

OP-300

**Success Story of a Local Women Entrepreneur in Pakistan**

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**Introduction:** The purpose of this case study is basically to provide females empowerment an outline that how Pakistan is providing the progressive environment to their females to compete with their male gender in a productive and competent manner to contribute in the growth of economy. This has become a fundamental area to study and understand particularly how women in Pakistan face problems, discover feasible solutions to remove constraints end up with successful entrepreneurs and provide motivation to other women that nothing is possible without consistent struggle.

**Case Study on a Success story of a local entrepreneur in Islamabad Pakistan:**

We will be discussing one success story of a local entrepreneur working in Pakistan right now. This case study encourages and promotes positive values and creates awareness about how women could be successful on entrepreneurship grounds in Pakistan. It reflects that women in Pakistan are making success stories by doing all those things which we see their counterparts are doing in the West. This success story can be a source of inspiration for any woman wishing to start or have desire to expand her already existing business. Indeed, it does not outline the stories of all women entrepreneurs, It does, nevertheless, give a glimpse of the rigorous proof, "Yes, they can do what actually they intend to be!" Restrictions from families to do business outside the house premises remained hurdle for many women over years in Pakistan but now globalization and technological advancement and social media has opened the greater opportunities for talented women of Pakistan to explore their aptitudes and search unexplored business opportunities, by turning the world into global community.

OP-301

**Regional Innovation Competition Index: The Case of Turkish NUTS 1 and NUTS 2 Regions**

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Innovation take place among new identifiers of both national and regional growth and competitive in the world economy is experiencing radical changes. At this point, it is important to reveal the determinants of regional innovation competitiveness. The main purpose of this study is to identify determinants of regional innovation competitiveness. For this purpose, regional innovation competition index of Turkish Nomenclature of Territorial Units for Statistics (NUTS) 1 regions and NUTS 2 subregions are created on the basis of the key indicators of European Union Regional Innovation Scoreboards 2014. In the study companies operating in the Technology Development Zones (TDZs) are selected as samples. Because TDZs have a potential power to create innovations and new technologies. The survey method is used in the data collection phase that includes 200 companies. When creating regional innovation competitiveness index, The Principal Component Analysis (PCA) is used.

OP-302

**Assessing Design Policies from an Innovation Models Perspective: The Case of Turkey**

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The innovative character of the industrialised countries contributes to their economic performance. Considering their success, it is apparent that the dynamics of innovation are not dependent only on scientific and technological developments but also include design, which acts as a bridge between

technology, services, user orientation, and social innovation. Design is viewed as an important tool for the innovation of products and services in these countries. Especially in the field of consumer products, design functions as a tool for product innovation. It is not only implemented by in-house activities in countries with powerful design sectors; design- and innovation-related external actors, including design consultancies, research centres, and R&D laboratories are also actively used. Innovation-related external actors contribute to a country's competitiveness by engaging in local and global collaborative networks they form among themselves, and with manufacturing industries. Awareness about the role and contribution of innovation and design in attaining competitiveness has been raised in Turkey, and relevant political, legal, and administrative regulations have been implemented in the 2000s. The ratio of manufacturing industry firms that have the capacity to make limited products and technological developments in Turkey is high. Yet, design is only now being developed as an independent sector. The use of collaborative (local and global) networks between manufacturing firms of different sizes and innovative outsourcing suppliers is low. The basic theoretical framework on which policies and supports are based relies on linear innovation models, and new generation innovation models are not actively used. This study aims to build a conceptual framework for the active use of design in product innovation by analysing the relevant public policies. To this end, the focus will be on current policy and strategy documents, and the design-support programs provided by the public.

**OP-303**

**The Role of Women in Turkish Economy from Feminist Economics Perspective**

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The role and place of women have been neglected for a long time in economy as well as in economics, and women have not been given due importance in these fields. Feminist economists criticise traditional-neoclassical economics claiming that conceptual basis for the mainstream economic knowledge is gender discrimination and women's experiences are not reflected in economics. In this light, they challenge economics suggesting that it should be reviewed and questioned including women's perspective.

Women have participated in various economic activities in varying shapes and status depending on the conditions of each period of history. However, in the true sense, women have taken place in working life under the status of "paid" and "workers" for the first time after the industrial revolution. Laws and practices that support working women, increased educational opportunities, demographic developments, shrinking family size, marriage rate reduction, divorce rate increase, single individual-family, non-standard operating modes, improvements achieved in attitudes towards women's work, child care and improvements in other services are important developments that play a role in increasing the number of female labour. In this context, the aim of this study is to examine women's role, status and issues in Turkish Economy from a historical perspective.

**OP-304**

**Antibacterial Polymer Based Transparent Coating for Elimination of Staphylococcus Aureus \***

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A polymer antibacterial surface has been successfully developed. The coating system used silanes as binder and Ag nanoparticles (AgNPs) as antibacterial agent. One hindrance to wide application of the antibacterial coating is the complexity of its deposition process and technique (eg; sputtering, CVD, spin-coating etc). They are expensive, require special training and suitable only for small size sample. In this work, only sponge is required to apply the coating onto the intended surface. Ball-milling and ultrasonication stirring were used to mix the AgNPs and silanes. The surface properties were characterized by FESEM. The antibacterial properties of the coating were tested against Staphylococcus

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aureus using JISZ 2801 method. This bacteria is known to cause nosocomial infections and have been posing problems in hospital all over the world. The need to provide bacteria-free environment is imminent especially in operation theatre (OT) and intensive care unit (ICU).

**OP-305**

**Polypyrrole and Thienyl End Capped Polysulfone Copolymers by Iron (III) Chloride \***

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This study presents synthesis of novel block copolymers of thienyl end capped polysulfone and polypyrrole via chemical oxidative polymerization by iron (III) chloride. Polysulfone is synthesized from bisphenol and bis (p-chlorophenyl) sulfone in presence of potassium carbonate. Polysulfone (PSU) was reacted with 2-thiophenecarbonyl chloride in order to synthesize a macromonomer containing thienyl end-group (PSU-ThC). Then copolymers of PSU-ThC and pyrrole were synthesized by chemical oxidative polymerization using iron (III) chloride as an oxidant. The synthesized block copolymers (PSU-ThC-b-PPy) were characterized by spectroscopic analysis and the electrical conductivities were investigated with 4-point probe technique. The obtained samples were also characterized morphologically by Scanning Electron Microscope (SEM).

**OP-306**

**In Situ Polymerization of Sepiolite Modified Polysulfone \***

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Polysulfone (PSU) is an amorphous engineering polymer with extraordinary chemical, thermal and mechanical properties. These properties might be listed as thermal stability, mechanical strength, high rigidity, stiffness, excellent resistance to hydrolysis, and acids and bases, resistance to creep, oxidative resistance and an extensive operative range of temperature and pH. Owing to these properties, polysulfones are used in the fields of materials science, biology and polymer science and have been the basis of numerous applications. Up to this point, PSU membranes are prepared for the applications such as filtration, hemodialysis, bioartificial organs, gas separation, water purification systems, and fuel cells, etc.

Sepiolite is a natural clay mineral. It is a member of layered silicates, especially it is a magnesium hydrosilicate. Its unique properties of high surface area, fibrous structure, porosity, crystal morphology and composition, surface activity, production of stable suspensions of high viscosity at low concentrations leads to many applications.

In this work, composites of PSU and sepiolite were prepared by in situ polymerization technique. Sepiolite was utilized as both raw material and enriched with minerals (Ag, Cu). Synthesized composites were characterized by FTIR, NMR and XRD measurements and they are going to be used as membrane fabrication.

**OP-307**

**High Performance Randomly Segmented Poly (Urethane Siloxane) and Poly (Imide Siloxane) Copolymers \***

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Polyimide materials with several kinds of mechanical properties have a great potential to use in aviation and space technology. One of these kinds of polyimide materials is poly(imide siloxane) copolymers. By this work, we

also aimed to get flexible substrates in order to use in solar energy technology as substrates. Randomly segmented Poly(imide siloxane) and poly(urethane siloxane) copolymers were produced based on benzofenon-3,3',4,4'-tetracarboxylic dianhydride (BTDA), 4,4'-oxydianiline (ODA) and bis(3-aminopropyl) polydimethylsiloxane (APPS). The ODA and BTDA are the hard segments, APPS and BTDA are the soft segments in the structure. Many kinds of these copolymers could be produced by adjusting the soft and hard segment lengths. Poly(imide siloxane) block copolymers were insoluble in many organic solvents. These copolymers were characterized by using FT-IR analysis. TGA and DSC analysis of the copolymers were measured. TGA was performed under nitrogen atmosphere at a heating rate of 20 oC min<sup>-1</sup> from 38 to 800 oC. The 10 % weight loss of the copolymers fell in the range of 400 to 450 oC. Radiograph measurements were investigated.

**OP-308**

**Weathering Effects on the Microstructure Morphology of Low Density Polyethylene \***

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Blown extruded films of low-density polyethylene (LDPE) have been subjected to climatic ageing in a sub-Saharan facility at Laghouat (Algeria) with direct exposure to sun. Samples were characterized by X-ray diffraction (XRD) and differential scanning calorimetry (DSC) techniques after prescribed amounts of time up to 8 months. It has been shown via these two techniques that crystallinity increases with exposure time. The reason of these morphological changes is relevant to photooxidative reactions leading to crosslinking in the beginning and to chain scissions for an advanced stage of ageing. The short chain segments resulting from scission reactions increase the crystallinity of the film via a chemocrystallisation process.

**OP-309**

**Impact of Solar Radiation Effects on the Physicochemical Properties of Polyethylene (PE) Plastic Film \***

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This study deals with the photodegradation of polyethylene films for greenhouse covering. The UV range of solar light appears as the most deleterious factor of plastic degradation in outdoor exposure. The reasons of this photosensitivity are structural defects which are light absorbing. The use of FTIR as an investigation tools has revealed that the material reacts with surrounding oxygen via a photooxidation process. Although, the photochemical process is quite complex it appears through this study than crosslinking and chain scissions are the most important events taking place during ageing. These two key reactions change irretrievably the average molecular weight affecting thus drastically the mechanical properties and reducing in the same way the service life time of the films

**OP-310**

**Effect of Metal Oxides Loading on the Modification of Microstructure and Phase Transformation of Nanocrystalline CeZrO<sub>2</sub> Synthesized Using Water-in-Oil Microemulsion \***

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In this paper, the microstructural and textural characteristics of a series of nanocrystalline CeZrFeO<sub>2</sub> (CZF) loaded with different concentration of Fe were reported. Nanocrystalline CZF was synthesized at room temperature using water-in-oil microemulsion method. The microstructure and textural properties of CZF nanocrystal were investigated using Dynamic Light Scattering, X-ray diffraction (XRD), and N<sub>2</sub> Adsorption-Desorption analysis. The results found that the micelles size distribution of CZF samples, measured by dynamic light scattering, revealed almost similar trend of distribution pattern. Nanocrystalline face centered cubic CZF was successfully produced without reduction at high temperature calcination. The influence of Fe loading on the modification of the microstructure and textural characteristics of CZF was clearly observed. In microemulsion system, higher number of smaller micelles was formed at higher Fe concentration. The micelles were distributed in a narrow distribution size, in the range of 6 to 44 nm. Fe ions also contributed in making the degree of crystal lattice shrinking and provided a larger surface area with the increasing of Fe concentration. XRD patterns of CZF tended to shift toward lower 2θ value with increasing Fe concentration which attributed to the replacement of Ce or Zr ions with the smaller Fe ions in Ce-Zr structure. The clearer effect of Fe loading was observed in modification of Ce-Zr textural. The surface area and average pores size of CZF increased with increasing Fe concentration, while the particle diameter decreased. However, all of CZF samples reveal the mesoporous profile (type IV) materials.

**OP-311**

**Factors Affecting Lecturers Motivation in Using Online Teaching Tools \***

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Motivation is the drive to will and desire to succeed or achieve something. Motivation in this treatment refers to when the lecturers feel the motivation in using online teaching tools in the classroom. Self-motivation of lecturers to change their teaching styles or methods is one of the problems stated by few researchers. The objective of this paper is to identify the factors that motivate lecturers to use online teaching tools, such as Web 2.0 tools. There are a variety of online teaching tools available to the lecturers. The popular tools are online whiteboard, WordPress, YouTube, Facebook, Edmodo and others. There are not many lecturers who apply the Internet as an alternative to provide access to information that can help to enhance teaching and learning materials. An evaluation of the lecturer's motivation had been completed by 30 lecturers from different subject matter experts. The instruments used were interview sessions and classroom observation, which were used to measure four motivation variables: ease of use, enjoyment, usefulness and self-confidence, based on the ARCS Motivation model. Based on the findings, factors that can affect lecturers' motivation in using online teaching tools are knowledge, perceptions and skills.

**OP-312**

**The Development and Evaluation of Online Project Based Collaborative Learning \***

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In the 21st century, educators are utilizing emerging technologies to develop not only knowledge of graduates, but also their soft skills in order to enhance their competence that meets the needs of employers. Collaborative learning has been proven in promoting soft skills development, however the feedback

from employers that students lack the soft skills. This shows that collaboration does not often happen naturally in a group. In previous studies, researchers have identified factors and elements needed to develop a collaborative online learning effective and also proposed an Online Project based Collaborative Learning (OPBCL) model. In this study, based on the model proposed previously, a prototype has been designed using the ADDIE model. Before the actual study carried out, the prototype should be ensured 100% working. Therefore, alpha, beta and accepting user test must be conducted. This study shows the process of testing carried out to ensure a prototype that has been developed to be fully functional when running the actual study. The results showed that the prototype can serve and ready to be tested in the actual study. It is hoped that this study will give emphasis to other researchers about the importance of conducting user acceptance testing to test the prototypes developed fully functional before the exact research.

## OP-313

### MOOC-Rec: A Case Based Recommender System for MOOCs ✱

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Learning processes and learning potentials are continuously investigated. Exploration of the possibilities of Technology Enhanced Learning (TEL) led to the development of many solutions and recently to Massive Open Online Courses (MOOCs). MOOCs are probably the most important “novelty” in the field of e-learning of the last years. MOOCs are capable of providing several ten thousands of learners with access to courses over the web. MOOCs have recently gained much attention especially in leading universities and are now often considered as a highly promising form of teaching. More and more universities are currently working to offer their courses in the form of MOOC providing learners with a wide variety of choices. With MOOCs proliferation, Learners will be exposed to various challenges and the traditional problem in TEL “finding the best learning resources” is more than ever up to date. Since information retrieval and searching for the appropriate learning resources is an essential activity in TEL, the development of recommender systems for learning has seen increased attention. Recommender systems permit to respond to the traditional problem. In the present paper, the authors address this major problem – the difficulty for learners to find courses which best fit their personal interests. They propose a system that recommends appropriate MOOCs in response to a specific request of the learner. Using the Case Based Reasoning (CBR) approach and a special retrieval information technique, the system proposes to the learners the most appropriate MOOCs (from different providers) fitting her/his request based on learner profile, needs and knowledge.

## OP-314

### Emerging Trends of Using Open Source Technology for Sustainable Teacher Training Programme in Bangladesh ✱

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Open Source Technology (OST) is now a powerful platform that has aptitudes in different extents. It provides many in-built software applications (e.g., Google Drive, One Drive, Dropbox etc.) at free of cost which can be linked to different educational applications. These applications have some features along with synchronizing documents in multiple electronic devices like desktop, laptop, tabs, and mobile phones that are not even available in many of the paid software. Moreover, these technologies have pedagogical, technological and financial affordances especially for developing countries, like Bangladesh that have budget constrains which results the issue of sustainability. Considering these aspects, OST could be a suitable alternative for the users of

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educational institutions in Bangladesh that might evolve many added benefits. For example, OST does not require any additional maintenance cost like annual software updating, domain and hosting charges and so on. Therefore, the aim of this paper is to provide a detail guideline of using this emerging technology for teacher training programme where trainers are the teachers and trainee teachers are the students. This conceptual paper shows the thorough procedures of how the users (teacher and student) can accomplish their specific tasks like producing, storing, sharing during the training programme by using OST. At the end of the training, the trainee teachers will be competent enough to use these applications to their own education settings. Thus teacher training would be a mean to introduce these emerging technologies in many educational institutions within a very short time. Moreover, using these technologies will not demand any cost other than the internet charge and hence the programme will be sustainable. An empirical research could be done in order to explore more potentiality this emerging concept.

## OP-315

### An Empirical Research on General Internet Usage Patterns of Undergraduate Students ✱

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As a growing trend in the world, internet-based research has become vital in one's daily life. The internet use by students has increased dramatically in recent years and also surfing the internet has become an important part of general student life. Furthermore, information technologies (IT) have greatly expanded into the field of education in last two decades. The aim of this research is to summarize the internet usage patterns of undergraduate students and to show in what density students utilize from internet sources for educational purposes. In accordance with this aim, we examined and reported their internet usage patterns and main purposes of using IT with a survey. The sample of this study includes 148 undergraduate students of Istanbul University, Turkey. As a result of this research, it was aimed to state a general profile of the students reflecting their practices towards internet usage. At the same time, this study reveals that using information technologies make students not just to consume technology but also lead them to produce it. Shortly, spending long hours during online might be helpful for young to make some contributions to their knowledge about information technologies and unlike some people's prejudices, surfing internet is not totally waste of time for students but more or less a productive facility.

## OP-316

### Postgraduate Digital Badges in Higher Education: Transforming Advanced Programs Using Innovative and Authentic Instruction and Assessment to Meet the Demands of a Global Marketplace ✱

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Post-secondary education is a massive industry undergoing significant growth. The demand for post-secondary education has never been higher and it is increasing every year (British Council, 2012). Moreover, globalization and technology are transforming this marketplace in dramatic ways. In general, the higher education marketplace is becoming more open and dynamic as traditional geographic barriers are disappearing. These transformations are leading to increased levels of international outsourcing and partnerships in developing and delivering education. In addition, the global workplace itself is becoming more dynamic; the individual demand for ongoing high quality lifelong education is increasing as the nature of jobs and work skills continuously changes (Hanover Research Council, 2010).

This increasingly open global marketplace for post-secondary education requires new innovative educational programming through flexible and innovative delivery methods. This is especially true in fields such as educational leadership, where the next generation of educational leaders need training in new models for post-secondary education.

One powerful method of addressing this new marketplace is through a system of digital badges. Digital badges have emerged on the internet to recognize and

communicate achievement in a variety of learning contexts, but particularly within informal learning contexts. Digital badges are created, displayed, and stored online; they are currently implemented as “micro-credentials” to convey skills acquisition and academic achievement with transparency (Acclaim, 2013). Although initially dismissed by higher education practitioners and scholars as reducing learning to overly discrete skill sets and/or focusing on lower level skills, many higher education institutions are now beginning to re-examine the potential of digital badges to support high level knowledge and skill development in formal education settings.

This paper will examine the current uses of digital badges in higher education, and discuss their use in addressing abstract higher-order knowledge and skill development. As one example, the paper will focus on a set of digital badges developed through an international partnership within the field of educational leadership in order to illustrate how digital badges can be structured to transform current degree programs to be more flexible, affordable, accessible, adaptive, and marketable in the global marketplace. These badges can be the foundation of more innovative and authentic instruction and assessment in advanced higher education programs, particularly if they are integrated into structured digital portfolios (or “e-portfolios”) that can support higher order skill development (Drury, 2006).

Overall, when combined with the use of performance assessments and digital portfolios within traditional certificate and degree programs, digital badges have enormous potential for increasing the flexibility and relevance of higher education degree programs in order to address the challenges of the new global marketplace in education.

OP-317

**Extraction of Modeling Parameters for Low-Loss Alternative Plasmonic Materials \***

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Plasmonics is a revolutionary branch of photonics which offers the benefit of both nanoscale electronics and broadband photonics by coupling the photon energy and momentum to free electron gas on the surface of metals generating a quasi-particle wave known as surface plasmon which enables the manipulation of light at the nanoscale. Though metals are the basic building blocks of plasmonic devices, they are blighted by high resistive losses at optical frequencies which restrict the development of surface plasmon based devices. This calls for the development of alternative materials for plasmonic application. Transparent conducting oxides such as aluminum zinc oxide (AZO) and gallium zinc oxide (GZO) behave like metals in the near Infra-Red region which enables the application of these materials as alternatives to metals in plasmonic devices.

The advantages include low intrinsic loss, tunability, compatibility with semiconductor based design and fabrication methods etc. In order to simulate the performance of these materials as plasmonic materials, the modeling parameters need to be found out. In this paper we report the Drude and Lorentz model parameters for AZO and GZO. The modeling parameters have been extracted using a nonlinear optimization algorithm. In order to validate the optimized parameters we have determined the complex relative permittivity using the extracted parameters and compared them with the experimental results and an excellent agreement has been found. The root-mean-square (RMS) deviations are found to be as little as 0.0259 and 0.0479 for Drude model and 0.0680 and 0.0587 for Lorentz model respectively for AZO and GZO. It is expected that the modeling parameters will be of great use to the plasmonics research community for the development of new devices.

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OP-318

**The Impact of Thermal Annealing to the Efficiency and Stability of Organic Solar Cells Based on PCDTBT:PC<sub>71</sub>BM \***

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Bulk heterojunction organic solar cells have been fabricated based on PCDTBT:PC<sub>71</sub>BM blend in three different procedures involving thermal annealing treatment. The first solar cell has been fabricated by spin coating PEDOT:PSS solution onto ITO-coated glass substrate in order to form 40 nm buffer layer and followed by the formation of 70 nm PCDTBT:PC<sub>71</sub>BM active layer. Without undergoing any treatment, an aluminium layer of about 100 nm thick has been formed on top of this active layer by means of thermal evaporation in vacuum condition. For the second solar cell fabrication, the active layer has been thermally treated at 70 °C for 30 min before the deposition of Al top contact. And for the third solar cell, the fabrication has been done exactly as previous but having additional thermal treatment at 70 °C for 30 min after the deposition of Al top contact. All the devices have been characterized by I-V measurement in dark and under light illumination in ambient condition. The first solar cell has shown the highest efficiency up to 9.32%, followed by the second solar cells that achieved 4.89% efficiency and the third solar cell with 2.32% efficiency. However, it is observed that the stability of first solar cells is drastically dropped after a day indicates that the solar cell had experienced a serious instability. The second solar cell shows an improve stability by having less reduces in it efficiency. While the third solar cell showing even better stability than the second one by giving an enhanced stability. It is observed that, without thermal annealing, highest efficiency could be achieved but has poor stability. While by having twice thermal annealing, the solar cell will have lower efficiency but better stability.

OP-319

**Using Kraft Black Liquor as Wood Preservative \***

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Under appropriate conditions, wood is easily degraded by diversity of biological agents. the most used method for protection of wood from biological organisms is impregnation with chemicals. However, increasing environmental pressure has caused to restriction of the use of toxic chemicals. In recent years, researchers have been looking for environmental friendly preservative chemicals, modification and impregnation methods to develop wood properties such as durability, water absorption, and dimensional stability.

In this study, the spent kraft pulping liquor was employed to Scotch pine sapwood (*Pinus sylvestris* L.) specimens as a wood preservative to enhance its durability against biological agents. The spent pulping liquor used in this study was obtained from pre-hydrolyzed kraft pulping process. Different concentrations (2.5%, 5%, and 7.5%) were used for black liquor. The test specimens were impregnated in a small scale impregnation container using vacuum of 650 mm/Hg for 30 min. Both test and control samples were tested for resistance to brown rot fungus; *Coniophora puteana* and *Poria placenta*.

Six weeks of exposure to brown rot fungus, *C. puteana* and *P. placenta*, resulted in noteworthy weight loss of control samples comparable to test samples. After six weeks of exposure to both fungus, the weight loss of control samples were more than 25%, while the weight loss of test samples were less than 3%. Among the different black liquor concentrations, 2.5% concentration provided the best wood durability on treated wood at the end of the biological test. These results indicate that kraft black liquor enhanced the durability of Scotch pine sapwood. It could be stated that the carbohydrate degradation products, resin and fatty acids, extractives, and the inorganic materials used in the process into the black liquor showed an inhibiting fungal activity.

OP-320

**Desalination of Produced Water Using Bentonite as Pre-Treatment and Membrane Separation as Main Treatment \***

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Produced water is any water that is present in an oil and gas reservoir and is frequently referred to as “connate water” or “formation water”. It will become produced water when these fluids are brought to the surface. This study is carried out to determine the capability of bentonite to adsorb Total Dissolved Solids (TDS) of the produced water after it was brought from the offshore. This pre-treatment is to ease the separation of polymeric membrane for a better produced water treatment. In addition, the study was also aim at the performance of the polymeric membrane by its permeation flux and rejection rate. Produced water will be tested by using the membrane testing rig to determine the rate of rejection and the membrane permeate flux per unit area. The process will be conducted in three (3) stages; 1) without the addition of bentonite, 2) with the pre-treatment using bentonite and 3) with the pre-treatment using bentonite and the addition of bentonite in the membrane solution, in order to determine which procedures give the best results. From the result of experiments, set 23 of polyethersulfone membrane (PES) was chosen as the best membrane based on its rejection rate and permeation flux of 17.21% and 0.0453 ml/cm<sup>2</sup>.psi. Moreover the pre-treatment of bentonite was prove to enhance the membrane performance.

OP-321

**Effects of Ammonium Nitrate on Physico-mechanical Properties and Formaldehyde Emissions of Particleboard \***

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Particleboard is a panel material manufactured under pressure, essentially from particles of wood and/or other ligno-cellulosic fibrous materials (wood chips, sawdust and flax shives ect.) with or without the addition of an adhesive, hydraulic binders being excluded. Urea formaldehyde (UF) composes more than 90% of resins used in manufacturing of particleboard in the world and ammonium chloride and sodium sulfate is the most suitable hardener in the production of particleboard (for UF). But UF is harmful for human health because of free formaldehyde emissions.

In this study, the effects of ammonium nitrate on the physical (density, thickness swelling and water absorption), mechanical (modulus of rupture, modulus of elasticity, internal bond strength, screw withdrawal resistance and surface durability) and formaldehyde emission of particleboard were investigated. For this purpose, the three-layer particleboards with 8 and 18 mm thicknesses and 0.65g/cm target density were produced using 11-9% urea-formaldehyde adhesive (core and surface, respectively), and 1% hardener (ammonium nitrate and ammonium chloride).

The analyses revealed the use of ammonium nitrate for particleboard manufacturing resulted in improved water absorption and thickness swelling properties after 24h of immersion in water. In addition, internal bond strength, screw withdrawal resistance and surface durability properties were positively affected by using ammonium nitrate. However, the ammonium nitrate has no significant effect on modulus of rupture (MOR) and modulus of elasticity (MOE). Formaldehyde emission values have decreased by about 5%. The study demonstrated that the particleboards with ammonium nitrate meet the requirements for general standard and building materials.

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OP-322

**The Effect of Tilted Magnetic Field on Graphene Cones\* \***

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One of the most fascinating discoveries in condensed matter physics is graphene[1,2]. Graphene and structurally similar materials show an amazing versatility from a wide variety of unusual morphologies. This variety of morphologies results from distortions of graphene sheets by the incorporation of various defects such as dislocations and disclinations. Dislocations are crystal defects arising from translational lattice incompatibility, which are measured by the Burgers vector, and disclinations are defects originating in the rotational incompatibility of crystal lattice, which are characterized by the Frank’s vector. We interested in disclinations in this study. Disorders plays a very important role in the electronic properties of low-dimensional materials. We examine the combined effect of both homogeneous and tilted magnetic fields on the energy spectrum of topologically defected gapped graphene cones with a long range Coulomb impurity[3] in the framework of perturbation theory. The results illustrate that a tilted magnetic field can significantly affect the spectrum of single particle low-energy effective Hamiltonian, besides lifting the degeneracy of angular momentum channels in the presence of topological defects. Moreover, if we take in the account of the azimuthal angle of tilted magnetic field, it influences the tilted magnetic field degree. Thus, the breaking of the electron-hole symmetry by magnetic fields is explained as a direct consequence of subband Landau-level coupling and this is enhanced by switching on the tilted magnetic field.

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OP-323

**The Characterization of the Irradiated ZrO2 Transparent Thin Films \***

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Zirconium oxide (ZrO<sub>2</sub>) thin film is very promising candidate for future thin layers technology due to its advantageous properties like good mechanical, thermal, optical and electrical properties. ZrO<sub>2</sub> thin film has a high refractive index, large optical band gap, high transparency in the visible and near infrared region and high corrosion resistance. Because of its special physical properties; it can be used in many industrial applications such as fuel cells, solar energy converters, optical coatings, radiation shielding, photonic devices, etc.

In this study, the changes in the linear attenuation coefficient of irradiated ZrO<sub>2</sub> thin films were determined using beta transmission method. The Sr-90 radioisotope was used to examine the linear attenuation coefficient of the film samples irradiated by gamma radiation at 0.430Gy, 0.672Gy, 1.195Gy and 2.690Gy. The utilization of Co-60 radioisotope with the activity level of 0.018021 Ci was preferred to control the absorbed dose.

The changes in the linear attenuation coefficient for beta radiation were investigated to evaluate the variations of the irradiated samples. The changes in linear attenuation coefficient for beta radiation were determined by using two different Sr-90 radioisotopes. Hence the details in characteristic properties were assessed with respect to two different activity levels respectively, 2558 µCi and 0.0513 µCi. There were the changes in linear attenuation coefficient of the samples with the rise of the absorbed dose.

OP-324

**Copolymerization of Pyrrole and Thienyl End Capped Cyclohexanone Formaldehyde Resin with Ce(IV) Oxidic Dibenzoate \***

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Block copolymers of polypyrrole (PPy) and thienyl end capped cyclohexanone formaldehyde resin (ThCFR) were synthesized via chemical oxidative polymerization of (Py) and ThCFR in the presence of cerium (IV) oxidic dibenzoate (CODB). The treatment of Py with CODB was maintained in non-aqueous media for one hour at room temperature. Several solvents including toluene, dichloromethane, were used. Besides the role of reaction media, the effect of ceric (IV) oxidic compound on polymerization was investigated.

Reactions with constant amount of Py, and CODB to Py mol ratios of 0.33:1.0, 0.5:1.0 and 1.0:1.0 were observed. The results showed that in one-hour limited time, block copolymers could be obtained in toluene and dichloromethane with CODB: Py: ThCFR mol ratio of 1.0: 1.0: 0.01. Conductivities of polypyrroles were determined by 4-point probe technique. Block copolymers were prepared in dichloromethane and toluene, respectively.

OP-325

**Copolymerization of Pyrrole and Thienyl End Capped Poly (dimethylsiloxane) by Iron (III) Chloride \***

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This study presents synthesis of novel diblock copolymers of thienyl end capped polydimethylsiloxane and polypyrrole via chemical oxidative polymerization by iron (III) chloride. Mono hydroxy terminated poly(dimethylsiloxane)(MH. PDMS) was reacted with 2-thiophenecarbonyl chloride (ThCCl) in order to synthesize a macromonomer containing thienyl end-group (PDMS-ThC). Then copolymers of PDMS-ThC and pyrrole were synthesized by chemical oxidative polymerization using iron (III) chloride as an oxidant.

The synthesized block copolymers (PDMS-ThC -b-PPy) were characterized by spectroscopic analysis and the electrical conductivities were investigated with 4-point probe technique. The obtained samples were also characterized morphologically by Scanning Electron Microscope (SEM).

OP-326

**Development of Injection Moulding Process of Cobalt Based Alloy Powder for Potential Orthopedic Applications**

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Metal Injection moulding (MIM) is an advanced near net shape forming process for high quality of complex shapes combined with high properties of materials. The concept of the MIM is based on mixing of the fine powders with a small proportion of polymer to form a feedstock that can be moulded. The granulated feedstock is then giving shape using injection moulding machine. After shaping, the polymer binder is then removed from the moulded part without significant disturbing the powder particles. Then, the powder is sintered at high temperatures. This paper presents the attempt to manufacture metallic hip stem using CoCrMo alloy powder by MIM process. Co-Cr-Mo alloys are increasingly being used as metallic materials for orthopedic implants.

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For example, a Co-Cr-Mo casting alloy has been used in the femur component of knee joints. A wrought Co-Cr-Mo alloy has been used in components such as hip heads, hip stems, metal-on-metal hip joint bearings, and knee stems. The CoCrMo alloy powder with the median particle size of 15 µm and a binder consisting of paraffin wax and poly ethylene were mixed at 160°C using a sigma-blade mixer for one hour to prepare the feedstock of the test bar and the viscosity was measured using a capillary rheometer. The test bar and hip stem prototype was injection moulded using vertical injection moulding machine with the nozzle temperature of 200 to 220°C. Prior to sintering, the specimens were debound using a combination of solvent extraction and thermal pyrolysis method. The specimens were then sintered under vacuum at the temperature between 1350°C to 1390°C. The properties of the sintered bar such as physical appearance and densities were presented and discussed.

OP-327

**Electronic and Magnetic Properties of Mn-Doped MgO**

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Using first-principle band structure methods, we investigate the electronic and magnetic properties of Mn-doped MgO in rock salt structure. Two approaches have been compared: the local spin-density approximation (LSDA) and the LSDA+U with a Hubbard-like Coulomb term. In both approximations, by reducing the lattice parameter, a transition from the high spin (S=5/2) to a low-spin (S=1/2) state has been found. The high-spin state is insulating, where as the low-spin state corresponds to a half-metallic ferromagnet if the Jahn-Teller effect can be avoided

OP-328

**Recycling of Waste Rubber in Roller Compacted Concrete**

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Recycling of waste rubber in pavements is considered as ecological and economical solutions due to their promising benefits, preserving of natural resources and to produce an eco-friendly material. Roller compacted concrete used in pavements (RCCP) has the same basic ingredient as conventional concrete: cement, water, and aggregates. But unlike conventional concrete, it's a drier mix-stiff enough to be compacted by vibratory rollers. Therefore, the fundamental characteristic of RCCP was its dry appearance, which requires the application of compaction efforts to consolidate the mix. Little information is available on performance of rubberized RCCP, because the largest parts of researches are conducted on rubberized conventional concrete and have not been reported on RCCP mixes. The main goal of this study is to investigate the possibility of using rubber wastes in RCCP. The shredded rubber particles are used as aggregates in concrete as partial substitution by volume of crushed calcareous gravels at different rates. Fresh and hardened properties are evaluated and compared according to the rubber content in the mix. In addition to that, the objective of this experimental work is to propose RCCP as a new eco-friendly application, which helps to remove some parts of these wastes and protect the environment.

OP-329

**Investigation of Residual Stress in Brake Pads**

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Vehicles have safety systems for breaking. Trucks and cars use different type of breaking systems such as mechanical, hydraulic, and electrical breaking system. These breaking systems transform mechanical energy into heat. Mechanical



breaking systems use a contact element. This friction element is contacted to a metallic or ceramic brake disc. The friction during brake causes formation of high amount of heat. During the operation, rapid heating and cooling cycles cause residual stress formation in brake pad. Residual stresses lead the formation of cracks and affect performance and lifetime of these most important safety parts of vehicles. In this study, residual stress distribution in brake pads is examined and a new method is proposed to predict residual stress in brake pads. Residual stress measurements are performed in various service life ended brake pads by using immersion ultrasonic technique which allows precious residual stress measurements with low cost.

**OP-330**

**Experimental Study on the Effect of Lime-Powder Addition on Performance of Algerian Swelling Soils**

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Clayey soils occupy large areas in Algeria. In many cases, these soils are characterized by a high sensitivity to the variation of its moisture condition and also by its high swelling potential: clay of Sidi Hadjres in northern region (M'sila), clay of Ain-Kada in western region (Sidi-Belabbas). The swelling aspect of these clays has led to significant disorders on the structures that were supported. In this context, the search of solutions and techniques to reduce the sensitivity of expansive clays has become indispensable. The main goal of this study was to investigate the possibility of improvement of the physico-mechanical properties of clayey soils taken from Ain-Kada region (Algeria) by addition of lime-powder. In this region, damages are frequently appeared in the pavement and structure projects due the high sensitivity of this clay to the variation of water contents. The lime-powder was added with different rates varying from 3 to 9%. In addition to that, the objective of this experimental work was to select the optimal lime-powder that was added to achieve a desired level of performance.

**OP-332**

**Technical Decision Making for Governments in Developing Countries: The Need for an Industrial Engineering Approach**

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Technical Decision Making including the management of the technology is a serious challenge not only to business but more critical for Governments due to large amount of money tied up with such decisions. Enormous number of alternatives with large number of conflicting criteria makes the final selection more complicated. Decision making under such conditions demands not only the experience but a deep understanding of theory behind taking decisions. Such understanding of theory cannot be inculcated in all the decision makers due to nature of Government structures particularly in developing countries. A quite common case is the wrong selection of the technology or under utilization of the selected technology without reaping all the competitive advantages it offers. This paper provides an Industrial Engineering based theoretical framework to assist Governments in technical decision making process, with a special focus on developing countries. The case of 3D printing is also presented to elaborate the view point.

**OP-333**

**Solid Fuel Derived from Microwave Irradiation Pyrolysis of Empty Fruit Bunch for Co-Combustion with Coal**

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An experimental study on pyrolysis of empty fruit bunches (EFB) was performed under microwave irradiation treatment for solid production as blending material with coal. The shredded empty fruit bunch was exposed to microwave irradiation using a modified domestic oven of 2450 MHz within an inert atmosphere. The investigations were done at various power levels (300, 600 and 1000W) and exposure time (10, 15 and 30 min). The solid yield was found to increase with power and decrease with exposure time. The reported calorific values of the char produced were comparable with that of a low rank coal. Additional experimental runs on combustion of the EFB char with Mukah Balingian coal was also performed using thermogravimetric analyser (TGA) for blending ratios of 50:50, 20:80 and 80:20 at heating rate of 20°C/min. The differential thermogravimetric (DTG) for the combustion of EFB char only shows one evolution peak with comparison to EFB biomass. The reactivity of the EFB char was found to be similar to that of Mukah Balingian (MB) low rank coal. Upon blending with Mukah Balingian coal, the reactivity of the blend was slightly increased while the maximum evolution temperature ( $T_{max}$ ) lowered by 50°C.

**OP-334**

**Potential Acacia and Its Mistletoe to Remove Heavy Metals in Wastewater**

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Acacia has a large source of tannins, and is one of the host plants for mistletoe. Tannin gelation is a chemical procedure that immobilizes tannins, the material resulting from their gelation. Gelation has been reported to be an effective way for removing heavy metals. Acacia and its mistletoe were undertaken to improve the rate of phytoextraction and to allow recycling of heavy metals accumulated in plant biomass. These techniques are very likely to support environmental remediation. Most phytoremediation systems are still in development, or in the stage of plant breeding to improve the cultivars for field use. However, application for environmental remediation purpose has already been initiated. Many opportunities have also been identified for research and development to improve the potency of acacia and its mistletoe to remove heavy metals. The result reveals that acacia and its mistletoe can be used to remove heavy metals in wastewater.

**OP-335**

**Preparation and Characterization of Poly-aniline/Iron Oxide Composites and Studying Their Activity in Colorization of Sunset Yellow Dye from Aqueous Solutions**

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 The College of Industrial Technology

In this paper, a Poly(aniline Iron Oxide composites (PANI/ Fe<sub>2</sub>O<sub>3</sub>) have been chemically prepared by oxidative polymerization of aniline in different acidic medias (HCl, H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub>), different aniline with primary concentration (0.208, 0.416, 0.625 M ), in presence of ammonium persulphate as an oxidant and amount of Fe<sub>2</sub>O<sub>3</sub>.

The composites have been characterized by FTIR, XRD, and SEM. The prepared composites have been used for removing Sunset Yellow ( SY ) dye, from aqueous solutions as adsorbent.

The effects of initial dye concentration, and temperature on the adsorption capacity of PANI/ Fe<sub>2</sub>O<sub>3</sub> for Sun set Yellow dye have been investigated in this paper.

The Langmuir and Freundlich adsorption models have been used for the

mathematical description of adsorption equilibrium data. The best fit has been obtained using the Freundlich isotherm with an R2 value of 0.988. The capacity of adsorption (Kf) values have clearly shown that the adsorption process is dependent on the temperature. This means that the process of adsorption is an endothermic process.

Furthermore, the calculated Kf by using (PANI/Fe2O3) composites prepared in different acidic medias as adsorbent for three dye SY has shown that (PANI/Fe2O3) composites prepared in the presence of (H2SO4) is the best in the adsorption of dyes. The adsorption follows the following order: PANI-Fe2O3(H2SO4) > PANI-Fe2O3(HCl) > PANI-Fe2O3(HNO3)

In addition, it has also been noted that using PANI/Fe2O3 composites, which are prepared in different aniline primary concentrations, the adsorption follows the following order:

PANI-Fe2O3 [ANI] = 0.625M > PANI-Fe2O3 [ANI] = 0.416M > PANI-Fe2O3 [ANI] = 0.208M

The change of Gibbs energy, enthalpy, and entropy of adsorption have been also evaluated for the adsorption of SY dye onto PANI/Fe2O3. The Intraparticle diffusion model has been concurrently operated in the removal of SY dye with PANI/Fe2O3.

### OP-336

#### Determination of Amino Acids in 15 Varieties of Beans Grown in Kyrgyzstan by High- Perf. Liquid Chromatography with Ultraviolet Detection

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String bean (fasol or too buurchak as it is named in Talas region, North West part of Kyrgyzstan) is a leguminous crop and is bean-shaped and black, white, brown, green or speckled in appearance. Beans are priority agro-economic trends in Kyrgyzstan. Kyrgyzstan has grown more than 20 varieties of beans. Basically the beans are exported, only a small part of it is used in the food area. In recent years, the diet of local consumers are deficient in protein. Proteins one of the most important components of the human diet, depends mainly on their amino acid composition, especially their content of the eight essential amino acids. The aim of the work to evaluate the amino acid composition of 15 varieties of local string beans and identify grain varieties of beans that contain a high amount of essential amino acids. Up-to-date the amino acid composition of local beans still not studied. Determination of amino acids in string beans by derivatization with diethyl methyl + methanol + Borat buffer and high performance liquid chromatography with ultraviolet detection. The experimental results will be presented.

### OP-337

#### Photon Buildup Factor Investigation Depending on the Sample Thickness for the Some Compounds

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**Objectives:** In this study, photon buildup factors were calculated for some chemical compounds in the different sample thickness using 241Am energy sources. Variations of buildup factor with thickness were reviewed for different compounds.

**Design and Methods:** The measurements have been made for CaO2, MgCl2, NiCl2, V2O3 compounds and five different thicknesses in the range of 0.43 mm-3.95 mm in a narrow beam good geometry set-up by the Energy Dispersive X-ray fluorescence spectroscopy (EDXRF) system. The mass attenuation coefficients for compounds have been calculated by using WinXCom computer program.

**Results:** The photon advancing in the material is exposed to many scattering and the secondary radiations occur as a result of the scattering. With the increase of the thickness, the probability of multiple scattering increases. This is known as buildup factor. The measurement results showed us that the buildup factor increased with increasing thickness of the samples.

**Conclusions:** The results of this work can be useful to determine correctly the dose of radiation and shielding technology.

### OP-339

#### Weak Localization and Weak Antilocalization in n- and p-type Modulation Doped GaInNAs/GaAs Quantum Wells

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We have performed magnetoresistance measurements on n- and p-type modulation doped GaInNAs/GaAs quantum well (QW) structures in a low magnetic field range (B < 0.5 T) at 75 mK. In n-type samples weak antilocalization, in p-type samples weak localization is observed. The observation of weak antilocalization is an indication of strong electron spin-orbit interaction. The low field magnetoresistance traces are used to extract the spin coherence, phase coherence and elastic scattering times. It is shown that, with increasing nitrogen composition, ratio between phase breaking time and elastic scattering time increases, this means that elastic scattering rate from the nitrogen related defects also increases. While compared to nitrogen free samples, it is revealed that incorporation of nitrogen into the GaInAs lattice decreases the spin-orbit interaction making the ratio of phase coherence time to spin coherence time smaller due to increased scattering by the nitrogen related disorders. By using spin coherence and elastic scattering times, Rashba parameter and spin-splitting energy are calculated. It is found that the Rashba parameter and Rashba spin-splitting energy decreases as the nitrogen content increases. In summary, spin-orbit coupling properties of carriers in a dilute nitride modulation doped quantum well structure can be controlled by changing the doping type, doping amount and nitrogen concentration. Consequently, this structure can be a candidate for spintronics applications.

### OP-340

#### Study of Low Temperature Conduction in 2D p-GaAs

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Because of the intense uses of the magnetoresistive materials in magnetic storage and air bag, several researches have recently been done to study the transport phenomenon near the metal-insulator transition in disordered systems. In this paper, we assess the underlying transport mechanism contributing to the low-temperature behavior of the electrical resistivity in 2D p-GaAs in the temperature range 0-1K.

We observed that the conductivity behavior follows the Efros and Shklovskii VRH regime, hence the Mott regime. Those phenomenons are due to the Coulomb interactions between electrons, leading to the reduction of the density of state near the Fermi level, EF, above a critical temperature TC. This has been graphically verified and confirmed by adjustments.

### OP-341

#### An Innovative Approach in Virtual Laboratory Education: The Case of "IUVIRLAB" and Relationships Between Communication Skills with the Usage of IUVIRLAB \*

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The aim of this study was the 3-dimensional active learning methods and techniques, interactive, multiuser and innovative Istanbul University Virtual Laboratory (IUVIRLAB) is to introduce the physics laboratory was developed as a model and investigate its relationships between communication skills

with the usage of IUVRILAB. Although there are many computer simulations and virtual laboratory applications, the model introduced in this study has a unique characteristics in terms of being a 3-dimensional, interactive virtual laboratory that enables students to learn in cooperative groups, and is the first in its kind due to its qualities of enabling multi-admin. and multi-user operation, having a special software compatible to run on ipad, iphone, android and smart phone platforms, and having been designed on the basis of active learning approaches and provoke innovation approach in e-learning. Due to its multi-user and internet accessible nature, the produced virtual physics laboratory was designed in a way suitable for the use of all active learning(problem-based learning in cooperative groups, cooperative learning, project-based learning, inquiry-based learning, research-based learning, learning through invention and structuralist learning) approaches that can be carried out with cooperative groups.

**OP-342**

**The Effectiveness of the IUVRILAB on Undergraduate Students' Understanding of Some Physics Concepts \***

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The present study was conducted to investigate the effectiveness of Istanbul University Virtual Laboratory (IUVRILAB) electromagnetic field and magnetism experiments on undergraduate students' understanding of electromagnetic field and magnetism concepts and to determine the students' misconceptions about electromagnetic fields and magnetism. IUVRILAB has unique characteristics in terms of being a 3-dimensional, interactive virtual laboratory that enables students to learn in cooperative groups, and is the first of its kind due to its qualities of enabling multi-admin and multi-user operation, having special software compatible to run on iPad, iPhone, android and smart phone platforms, and having been designed on the basis of active learning approaches. To determine 120 (n=60 experimenatl and n060 control groups) students' misconceptions about electromagnetic fields and magnetism and the effectiveness of IUVRILAB, Magnetic Field Concept Test consisting 20 items was used as a pre-test and post-test. According to the results, twenty-four misconceptions about electromagnetic field and magnetism were identified. The results from the paired sample t-test indicated that the students who were instructed using IUVRILAB instruction had significantly higher scores in terms of achievement than those taught by the traditional approach and it was also found that IUVRILAB group was more successful in preventing of the determined misconceptions.

**OP-343**

**Utilization of Educational Technology to Enhance Teaching Practices: Case Study of Community College in Malaysia \***

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This study was conducted to explore the barriers in utilizing educational technology among lecturers in their teaching practices in one of the community college in Malaysia. Moreover, this study also aims to identify lecturers' perception towards the usage of the educational technology. Barriers that have been identified can be categorized into lecturers' computer self-efficacy; accessibility of the educational technology; technical support in utilizing the educational technology; and support from administration. A structured questionnaire was distributed to all lecturers in the institution and 72% of the lecturers agreed to participate as respondents. The result from this study shows that the lecturers in the community college have positive perceptions that educational technology enhances their teaching practices and students' performance. Ranks of the barriers from the higher mean score that have been identified are technical support, administrative support, computer self-efficacy

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and accessibility. Analysis pointed out that lecturers of the community college are ready to utilize the educational technology in their teaching practice. However, the technical supports must enhance Internet and computer facilities. Furthermore, institution is recommended to provide more training for lecturers to sharpened their teaching skills in utilizing the educational technology.

**OP-344**

**Community College Students' Perception Towards Digital Learning in Malaysia \***

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Digital learning is an effective teaching method to enhance students' learning experience. It emphasizes a high quality teaching experience and provides access to challenging contents, feedback through formative assesment, and self-learning opportunity at student's own pace. Therefore, this research had been conducted to identify students' perception towards digital learning implementation and its suitability in Malaysian Community Colleges. 81 students from Certificate of Computer System and Support Programme in 3 Community Colleges in Malacca state had participated in this study. Method of analysis used in this study was descriptive and inferential by using a questionnaire as an instrument. The findings showed that the level of students' perceptions of the use of digital learning was high and from the analysis carried out revealed that the level of appropriateness of the use of digital learning in Community College was also high. The findings also showed agreed that D-learning practices can improve the quality of their learning. The findings of this research could be a useful guide to the management and lecturers of Community College in setting up and planning for the strategy to improve the level of professionalism and availability of infrastructure, so as to fully implement the digital learning practice.

**OP-345**

**The Founding of Apple and the Reasons Behind its Success \***

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*Dokuz Eylul University*

Apple Corporation is one of the most profitable, and socially influential companies that ever existed. Its products are in homes, businesses and entertainment venues. It constantly brings out new high-tech tools to the consumer electronics market, the most recent one being the Apple Watch. The creation of this company is more humble, and is the result of a conjuncture of various factors that have converged to create a unique environment. It all started with a group of amateur electronics enthusiasts. Smart individuals, an engineering-oriented social environment, business angels willing to invest in a new start-up company, and the developments in technology appearing at the right time and place have all contributed to this creation. It took engineering knowledge, visionary management and a business outlook to succeed. Individual entrepreneurs and developing countries carefully study the reasons behind the success and influence of Apple, so that they could recreate the conditions for imitating similar successes for themselves and their countries. Especially universities are encouraged to launch start-up companies and dive into the commercial world. Techno-parks are built to imitate the achievements of garage founded companies such as Apple. In this study, the perceived and deducted reasons for Apple's success are examined using an opinion survey, and accounts of the founders are examined and conclusions are made based on this information. The results show that the perceived and true reasons for Apple's success may be very different and that a legendary image of the company with an ardent fan base may obscure the true reasons behind its success.

OP-346

**Comparative Analysis of Real Time Replication Service Efficiency on Enterprise Level \***

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In today's growing of enterprise data, in order to make a full use of the capabilities of hardware, increasing application performance, reducing cost of ownership and enabling new scenarios that were not possible before such as are today's developed in-memory data platforms is essential. In this paper, an in-depth analysis of benefits and features of in-memory database comparing to standard relational database management system is presented. Moreover, an implementation of real-time data replication from a production ERP landscape system to database is conducted, where the experimental results shows the flow of data replication and the key benefits for an enterprise.

OP-347

**A Modified Expectation of Maximization Method and its Application to Image Segmentation \***

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In this paper we describe a modified segmentation method applied to image. An EM algorithm is developed to estimate parameters of the Gaussian mixtures. Recently, researchers are focusing more on the study of expectation of maximization (EM) due to its useful applications in a number of areas, such as multimedia, image processing, pattern recognition and bioinformatics. The human visual system can often correctly interpret images that are of such poor quality that they contain insufficient explicit information to do so. The difficulty is mainly due to variable brain structures, various MRI artifacts and restrictive body scanning methods. The IBSR image segmentation data set is used to compare and evaluate the proposed methods. In this paper, we propose a modified expectation of maximization (MEM) based on the properties of likelihood, while eliminating number of iteration a reason a fast converge to the center of cluster and your application to image segmentation. The experiments on real images show that (1) our proposed approach can reduce the number of iterations, which leads to a significant reduction in the computational cost while attaining similar levels of accuracy. (2) The approach also works well when applied to image segmentation. A methodology for calculate is presented for making use the error between the ground truth, human-segmented image data sets to compare, develop and optimize image segmentation algorithms. This error measure is based on object-by-object comparisons of a segmented image and a ground-truth (reference) image. Experimental results for segmented images demonstrate the good segmentation performance of the proposed approach.

OP-348

**Graph Representation of Relational Database for Concept Discovery \***

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Multi-relational concept discovery aims to find the relational rules that best describe the target concept. In this paper, we present a graph-based concept discovery method in Multi-Relational Data Mining. Concept rule discovery aims at finding the definition of a specific concept in terms of relations involving background knowledge. The proposed method is an improvement over a state-of-the-art concept discovery system that uses both ILP and conventional association rule mining techniques during concept discovery process. The proposed method generates graph structures with respect to data that is initially stored in a relational database and utilizes them to guide the concept induction process. A set of experiments is conducted on data sets that belong to different

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learning problems. The results show that the proposed method has promising results in comparison to state of the art methods.

OP-349

**State of the Art of Semantic Web for Healthcare \***

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The ultimate goal to improve healthcare practices and the development of better biomedical products largely depends on the ability to share and link the wealth of collected medical data. The key challenge to pursue this ambitious objective is not only enabling the integration of the data spanning heterogeneous data sources and formats, but in the development of tools and standards for flexible search, data analytics and user friendly interfaces. In this paper we conduct an extensive survey on how Semantic Web is used to answer these challenges. First, we review ontology management and semantic data repositories for healthcare. Second, we conduct a survey on most representative applications and user – friendly viewers for semantic healthcare data. Third, we analyze the data mining and data analytics approaches used to find useful patterns and knowledge in these data. Finally, we discuss the positive effects of this synergy between Semantic Web and healthcare processes, and we identify some of the major remaining obstacles and research challenges in this area.

OP-350

**Methods and Techniques of Adaptive Web and Mobile Accessibility for Blind and Visually Impaired \***

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Massive volumes of information shared on the web together with linked open data initiatives and Exabytes of data generated through social networks frequently disorientates and confuses web users in their everyday interaction. Additionally, web users constitute a highly heterogeneous entities with different needs and requirements. Considering this, user adaptive software systems have been developed as a new application approach to ease the interaction between users and web information with the intent to bridge the gap between such presentation and navigational pitfalls. The user adaptive interaction is especially useful when considering a marginalized group such as blind and visually impaired users. This paper attempts at providing an overview of a state-of-the-art survey concerning adaptive interaction between users and a web information space with special emphasis on exploiting methods and techniques for adaptive web and mobile accessibility for blind and visually impaired people. Likewise, the exploration of possibilities of new methods and techniques for user adapted interaction for blind and visually impaired is highly required in order to alleviate the accessibility according to Web Content Accessibility Guidelines (WCAG). Recent studies indicate that even when the guidelines are implemented on web information systems, there is little indication that people with disabilities will have better accessibility. To address the above mentioned we introduce various visual and auditory approaches to improve such adaptive methods and techniques for blind and visually impaired.

OP-351

**Development of a Blood Bank Management System \***

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The process of managing the blood bag that is received from the blood donation events needs a proper and systematic management. The blood bag must be handled with care and treated thoroughly as it is related to someone's life. The development of Web-based Blood Bank Management System (BBMS) is proposed to provide a management functional to the blood bank in order to handle the blood bag. In Kuala Terengganu, East Peninsular Coast of Malaysia

has only one government hospital that handles blood bank currently is using a standalone system. This web-based management system was developed to meet the requirements for Sultanah Nur Zahirah Hospital (HSNZ). Other hospital may have different ways and approach of handling blood bag. The methodology used to build this system uses the Rational Unified Process (RUP). The technology platform in implementing this system uses J2EE programming environment with Java and JSP, using MySQL for SQL database and HTML5, CSS and JavaScript for web development.

**OP-352**

**Mobile Technology Applications in the Healthcare Industry for Disease Management and Wellness ✱**

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Technology is an unavoidable fact of today's life. Attractive advantages of wireless technology accelerated the rapid development of mobile applications. With the increase of the usage of mobile devices in the recent years, new solutions come to mind including mobile technologies to fulfill requirements or suggest better solutions in the vast area of medical informatics to the existing ones. Augmentation in the area of wireless technology positively affects the medical applications. In the healthcare industry, mobile applications provide better personalized health care, disease management and services to patients and their relatives, as well as a better and flexible way of communicating with physicians, patients and medical suppliers. It is obvious that the applications using mobile technologies has the potential to bring better conditions both for the patients for their disease management and for the humanity for checking their self wellness. In this paper, the current mobile technology utilized in healthcare such as relapse prevention in schizophrenia, aged people's care and wellness, diagnosis and management of attention-deficit etc. is reviewed in detail outlining the current mobile technologies and wireless revolution of today and examining some of the outstanding applications using these technologies in the clinical area. The results of this study can provide clues to researchers to further the mobile technology in healthcare.

**OP-353**

**The Evolution and Economic Influences of Online Banking as an Innovative Distribution Channel: The Case of Turkey ✱**

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The banking industry is one of the fastest sectors realizing the developments and changes in the field of technology innovation. Demand on web based banking products increased as a result of expanding customer focused service understanding, decreasing attainability cost, its competitive market structure and consumers' wish to reach banking products fast, effective, productive way. Besides being periodically diversified, the innovative banking tools attract fast increasing demand in years. This study examines the development of web banking tools used in Turkish banking industry and products of these tools, and consumer reaction in this development level in economical framework. The study also investigates the effectiveness of Turkish banking industry by means of innovative products and processes made by web banking product channels used in Turkey with a structural analysis. The study concluded finding out that the number of products used in web banking and consumers making use of these products noticeably increases in time. Overcoming clash between web infrastructure and banking industry security, diversification of banking products, strengthening the comprehension of tendency of using web banking, will be effective on speeding-up development of web banking increasingly.

**OP-354**

**Financial Innovation – Crowdfunding: Friend or Foe? ✱**

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A phenomenon with a considerable past, and with new conspicuous investment models and financial products and services promulgated swiftly through the internet, financial innovation seems to be almost ubiquitous these days. While there are numerous advantages, especially nowadays through the exploitation of easily accessible, low cost and convenient e-commerce platforms, innovation in the finance sector does not come without its perils. Banks and traditional financial institutions are losing chunks of market share to virtual intermediaries and investors are operating in relatively less regulated and consequently less secure environments. Furthermore, from the perspective of all stakeholders, there is a Knightian uncertainty component of the long-term ramifications in investing in and through newly developed products and platforms. As such, it was only recently that economic history witnessed the outbreak of the sub-prime mortgage crisis caused by the unraveling of a chain interlinked through the unprudent use of “innovative” derivative transactions involving credit default swaps backed by the insatiable appetite of the “irrationally exuberant” investor and the easement of regulation paving the leeway for predatory lending. This paper investigates whether and to what extent innovative investment models such as crowdfunding, as the game-changer forcing the tightly regulated securities markets to adopt to the rules of the WEB 3.0 era and relieved through the provision, Title III, of the JOBS Act, could be a potential peril. To that end, it discusses the evolution of the crowdfunding model in the realm of the technology push – demand pull innovation framework and analyzes the current situation of the equity crowdfunding market in terms of size, regulation and major players.

**OP-355**

**Interaction Between Internet Banking and Bank Performance in Developed Countries and Emerging Economies: The Case of Europe ✱**

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In this study, the interaction between internet banking and bank performance is investigated by panel causality tests. Banking data of 30 Europe country analyzed by Demitrescu-Hurlin panel causality test for the period 2005-2013. ROA and ROE ratios were used as measures of bank performance. Not only whole sample consisting of Euro Area and the others but also Euro Area and the other countries in Europe considered as samples and tested two sub-samples. Results show that a strong relationship through internet banking to the bank performance in the Euro Area countries and for the rest of the Euro Area countries are also not determined causation significantly in both directions. On the otherhand, there is also a significant relationship internet banking to performance of the bank considering the whole sample.

OP-356

**The Effects of Innovations on Bank Performance: The Case of Electronic Banking Services \***

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In this study, we investigated the effects of the bank's profitability performance of electronic-based banking services. The effects of ROA and ROE performance were analyzed the data, which are 23 developed and developing countries' electronic banking services through 2005 to 2013, by dynamic panel data methods. Due to the innovative nature of electronic banking services will show the bank performance significantly. Both the analyzing method and involving of developed and developing countries' banking data are the most obvious differences of the study from similar studies in the literature. Result show that bank profitability of developed and developing countries affected from the ratio of the number of branches to the number of ATMs is highly significant and electronic banking services in significant. Results show that some variables were found to be in contrast to the expected negative relationship, because of diversity in the level of development of the countries, the socio-cultural structure and electronic banking infrastructure.

OP-357

**Transformation of Consumption Perceptions: A Survey on Innovative Trends in Banking \***

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Having a 65 year history, credit cards like we use today brought about a great transformation and dissolved the obligation of being dependent on holding cash. In line with technologic improvements, evolving with increasing acceleration, the world of economy and finance is experiencing a new transformation nowadays. These technological improvements have challenged financial service providers with the change in the way of buying, selling or doing business. As a result of developments in mobile technologies, this time credit cards themselves are facing a drastic transformation by means of increasing penetration of smartphones, at least materially. With the evolution of consumer technology, consumers will leave the traditional ways of consumption, their leather wallets and standard credit cards, etc. Along with both the improvements in technology and the change in consumer perception and wants, the theory of finance is also changing a separate but similar trajectory due to the help of new security designs, telecommunication technology improvements. This paper aims to provide a unique insight into how financial sector will evolve in the next decade and tries to draw out the drivers of this change. In this aspect, our study will provide series of new trends. Toward this end we will present six new trends, namely; biometric technology, contactless payment systems (m-POS), NFC Simcard technology, Host Card Emulation (HCE), mobile Wallet (m-Wallet) and other wearable payment systems, and discuss their probable impacts over banking sector and shopping habits.

OP-358

**Bank and Insurance of Garbage Become New Land Investment**

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*Tanri Abeng University*

Growing public interest to invest in financial and insurance sector to prepare for their future in a professional company that offers profitable return to the customers so huge, so it makes a lot of companies create insurance system and a profitable investment, Indonesian Life Insurance Association (AAJI) launch, the number of customers jumped 92.5%, from 45.77 million in 2012 to be 88.13 million until the end of last year. Customer growth was due to higher number of insured individuals and groups (Christine Novita Nababan,2014) and with the movement of money into the large numbers and be able to fund many community and developed into other investments sectors, but on the other hand there is the idea of creative ideas from the community by creating a system like the small scope of investment in waste management, with bring up the idea to make a bank & insurance trash or garbage that is supported by sponsors, with the aim to help the community in economic and environmental concerns to reduce the spread of litter and the public and people support for banks and trash insurance is so great that encourages development but the public is less aware that it is able to produce the financial sector is very large when seen from the large banks and insurance support for this garbage from public.

OP-359

**New Products in the Islamic Finance Industry: An Overview of the World and Turkey**

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World financial system has undergone great changes and has faced some innovations from past to present. Whereas until 1960s just conventional financial system had been applied, from now on then Islamic financial system (participation banking) has taken place in practice. Through this new system, potential investors sensitive to interest due to their religious beliefs have been involved in the financial system. Although participation banks are similar to the traditional banks in the aspect of the form, unlike traditional banks, participation banks operates in line with profit/loss participation rather than interest while collecting funds and let them use. Since interest-free banks do not use interest of traditional financial system, they have either co-ordinated traditional financial products according to Islamic requirements or brought out new financial products appropriate to Islamic laws. The fact that participation banks have co-ordinated traditional banking products into interest-free system has been always discussed and it has been widely accepted that it is inappropriate to Islamic laws. Therefore, Islamic financial institutions in Turkey and all over the World have begun to bring out new Islamic financial products. In this study, new products of Islamic financial system in the World and Turkey will be introduced. Their appropriateness to the market and contributions to economy and Islamic financial system will be dealt with, and also their applications in different countries will be compared to those in Turkey.

OP-360

**The Effect of Lime Stone Powder on Collapsibility and Shear Strength on Gypsiferous Soil**

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The presence of gypsum in soil as bond agent alters its behavior, It influences engineering properties of soil. This influence depends mainly on the amount and type of gypsum presented in the soil. The soil samples (S1 & S2) used in this study were brought from two locations in Makhmur area. These soils had different gypsum content of (30.5% & 20% respectively).

Gypsiferous soils causes problem to the structures due to dissolution in water when contacts with it and shrinks when they dry. The aim of this research is to improve the gypsiferous soil by addition of limestone waste powder obtained from two different areas (Said sadiq, Pirmam) with different percentages (5%, 15%,25%).

The results show that the addition of limestone powder to soil decreases the collapse potential (C.p) while increases the cohesion (C). Depending on the geotechnical tests it is concluded that the cohesion of (S1) is less than that of (S2), while the collapse potential of (S1) is more than that of (S2) due to the higher gypsum content of (S1).

OP-361

**Modern Civilization Regions of The World**

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Modern civilization has gone the way of social and economic development in different regions. And in terms of the development of the regions surrounding nations increasingly sophisticated themselves. North America, Australia and the UK resettlement civilization for a long time, and the new term spread are considered followers of civilization. As well as in South Asia and Southeast Asia have been developed with the features of their own. SEE in recent ethnically Chinese, the Japanese economy will grow stronger effect. Civilization individuals and social groups, social, economic, socio-political, moral norms that govern the relations between system performance and system is a method of reproduction of social life. I want to touch the core problems of civilization, so we can say the exact article.

1. The replacement of the socio-economic formations historically
2. The emergence of new forms of organization
3. The planet, which can be the cause of international conflict, eliminating hot spots
4. The end of the Cold War, economic, scientific-technical partnership, expansion of culture and information

Not only wars, but today we saw a catastrophic power, wealth, position greed, envy, lies and hypocrisy was not there. The great M.Enqelqart's (Enqelqart's "Civilization is a disease"), as would prove to the world that these civilizations However, due to the numerous ethnic and religious conflicts in these regions of the world "gunpower continent" would not be wrong to call. This region is rich in oil reserves major conflicts. Despite the high cost of oil in the remaining countries in the region, the economic currently available, unfortunately. Standing tradition of religious tolerance and intercultural dialogue with the level established over centuries, as well as the strengthening of tolerance and promoting the world as a model, regarded as more appropriate.

OP-362

**Low Electromagnetic Field Effects on Brain Tissues in Rats**

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The biological effects of electromagnetic field (EMF) have growing concern among researchers, however the harmful effects of electromagnetic fields remained equivocal. The aim of this study was to investigate the effects on the brain of rats periodically exposed to 0.1 mT EMF. Total 24 adult male Sprague-Dawley rats subdivided randomly to 4 groups: 2 control groups (control group 6 hours: 6 h/day for 5 days; control group 20 hours: 20 h/day for 5 days) and 2 treatment groups which exposed to 0.1 mT EMF (treatment group 6 hours: 6 h/day for 5 days; treatment group 20 hours: 20 h/day for 5 days). There was a significant decrease of the pyramidal cell number for treatment groups 6 hours and treatment group 20 hours. The total numbers of pyramidal cells for treatment group 6 hours was 15.18 % lower than control group 6 hours while treatment group 20 hours was 33.54 % lower than control group 20 hours. There was a significant decrease of the Purkinje cell number for treatment groups 6 hours and treatment group 20 hours. The total numbers of Purkinje cells for treatment group 6 hours was 11.20 % lower than control group 6 hours while treatment group 20 hours was 16.19 % lower than control group 20 hours. In addition, there was no significant difference between the thickness of granular layer and molecular layer in the control groups and treatment groups. Additionally, changes of cell morphology can be seen in the region of cerebrum and cerebellum at histological observation for both treatment groups. Significant increase for treatment group 20 hours (10.7% higher) in levels of norepinephrine. These results suggested that exposure to EMF can exert negative effect on brain of rats.

OP-363

**The Validity and Reliability of the Turkish Version of the Workplace Forgiveness Scale**

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To measure and evaluate the workplace forgiveness levels of workers and managers is an important issue. The aim of this research is to examine the validity and reliability of the Turkish version of the Workplace Forgiveness Scale (Boonyarit, Chuawanleeb, Macaskill, & Supparerkchaisakul, 2013). Participants were 207 workers. Firstly, the Workplace Forgiveness Scale was translated into Turkish by five academicians. Secondly, the Turkish form was back-translated into English and the consistency between the Turkish and English forms was examined. Thirdly, Turkish form has been reviewed by three academicians. Finally they discussed the Turkish form and along with some corrections this scale was prepared for validity and reliability analyses. In this study confirmatory factor analysis was executed to confirm the original scale's structure in Turkish culture. As reliability analysis internal consistency coefficients and the item-total correlations were examined. The results of confirmatory factor analysis indicated that the 23 items loaded on four factors and four-dimensional (overcoming negative thought and feeling toward the offender, seeking to understand the offenders reasons, fostering positive approaches towards the offender, and belief in the benefits of forgiveness) model was well fit ( $\chi^2= 462.56$ ,  $df= 217$ ,  $RMSEA=.076$ ,  $CFI=.83$ ,  $IFI=.84$ ,  $GFI=.83$ ). The Cronbach alfa internal consistency reliability coefficients were.65 for overcoming negative thought and feeling toward the offender subscale,.72 for seeking to understand the offenders reasons subscale,.82 for fostering positive approaches towards the offender subscale,.80 for belief in the benefits of forgiveness subscale, and.80 for overall scale. Overall results demonstrated that the Workplace Forgiveness Scale could be named as a valid and reliable instrument that could be used in the field of organizational and industrial psychology.

OP-364

**Institutional Structure and Regulation of Nanotechnology in Turkey: Does Governance Viable Option**

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Summary: During the last decade or so there appears to be some significant developments concerning nanotechnology. Like any other new technology with a wider application, the products of nanotechnology brings with it some risks and uncertainties alongside the opportunities and positive impacts. There is an ongoing debate whether, these possible risks and uncertainties should be regulated, and if so, what will be the best regulatory approach? To put it differently, whether conventional regulatory approaches should bring desirable and effective outcome as far as nanotechnology is concerned; particularly relevant is how should we evaluate the possible impact of nanotechnology in terms of social health, work conditions and environmental security? The primary aim of this article is to evaluate the legal and institutional framework for nanotechnology: what is the primary concern for policy makers as far as nanotechnology is concerned and how the national strategy is set up? This is particularly relevant in terms of current paradigm of the relations between technology and society and how these concerns are reflected? The relationship between society and technology and the concept of uncertainty will be the two premises which the article intends to focus. First of all, literature on the current examples of regulations and governance from the perspectives of uncertainty and risk management on nano/science and nano/technology will be assessed. It will be followed by the assessment of current regulatory and institutional structure in Turkey. Finally we will focus on the sufficiency of current regulatory and institutional structure in Turkey within the context of uncertainty, risks and opportunities and yet the possibility of applying governance model in Turkey.

OP-365

**Social Media: Facebook and Twitter as a Marketing Tool**

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In today's technological era social media has become a vital phenomenon. Social media has become a part of daily life as well as has aroused the attention of companies wishing to increase their profitability. At the same time the impact of the social media has created new marketing strategies. In this project strategies, campaign applications and measurement methods used in social media in Turkey and in the world have been surveyed. Interviews were made in detail with companies using the social media successfully such as Anadolu Efes and Ülker companies and social media agencies like iProspect, GroupM and Somera. The result of the survey has in general shown that both deciding on the right media platform choice and in accordance to this choice selecting realistic KPI's are the key to success. Interviewed companies as well as agencies have agreed upon the fact that in regard to the campaigns companies and agencies should be working hand in hand. However they also emphasize that company employees should be qualified people who would be able to manage and run the campaigns. Moreover it has been confirmed that collecting the right data about consumers and the right choice of target consumers do play a significant role in the success of the campaigns. In this project the results of the survey were commented upon and further, necessary steps to be taken so that the social media in Turkey can be used as a successful communication tool were mentioned.

OP-366

**Social Marketing: Roles of Trust, Consumer Knowledge and Perceived Needs**

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Social marketing as the application of marketing principles and exchange to social issues is best known for its use in campaigns related to public health and the environment. Successful strategies of social marketing have been known to solve many social problems as indicated by growing usage of social marketing by both non-profit and profit organizations. This study aims to conceptualise different factors that may impact intention to use legal assistance. It is posited that trust, awareness and perceived benefits will moderate the influences that attitude, subjective norm and perceived behavioural control have towards intention to use legal assistance programme. The respondents of the study are people who are the targeted audiences of legal assistance programme in Indonesia. The targeted audiences are people who cannot afford to get legal assistance should they in need of it. This study will utilise both qualitative and quantitative research methods. Qualitative method is utilized at the beginning to serve as an exploratory research. In-depth interviews will be conducted with key persons involved in legal assistance programme, including people from legal aid institutions and other legal-related government institutions. The quantitative data gathered from the survey method will be analysed using regression analysis methods. This study is expected to provide insights into the social marketing efforts of new regulation or policies. It is acknowledged that the limited literatures in this field would mean that this study is expected to provide insights to the marketing literature in general and social marketing literature in particular.

OP-367

**Attitudes of Academic Staff Towards Innovation and Entrepreneurship: Toros University Example**

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 Toros University

One of the most important source for innovation and entrepreneurship is university. Therefore attitudes of academic staff in universities are important to make innovative ideas to grow and come into actions. This study investigates the effects of demographic factors (gender, age, education level, title, faculty, experience, administrative duty, weekly lecture hours etc.) of academic staff on innovation and entrepreneurship based on Toros University, a foundation university in the city of Mersin. The results are to be obtained based on a survey developed by this study and Can be utilized to provide an environment that can support innovation and entrepreneurs in universities.

OP-368

**Factors Affecting the Recreation Activities of Students of Halic University**

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Recreation, derived from the Latin word "recreatio" and meant regeneration, is resting and having fun by creating leisure time in order to escape from tiredness of life arising from the monotone lives of people. The target of recreation activities is not only to rehabilitate the people physically but also it rehabilitates spiritually. Recreation, affecting the personality developments of people positively and increasing efficiency in their business lives by developing their skills, brings solidarity and integration together in terms of sociality. Considering high young population rate, chronic problems in our education system and university youth as dynamic and driving force of the society; how important recreative activities are for university youth is revealed. Within this context, the presence of units that will provide students of our



university to participate in cultural, social and sportive activities becomes more of an issue. Such units will provide to develop the communication skills of the youth and become social and also will improve their rational decision taking skills by empowering their spiritual structures.

Recreation, which is one of the most important factors to increase self-confidence and self-esteem of university students who will determine future of countries, is actually a whole of activities required to be carried out synchronously with process of education.

The purpose of this study is to determine in which activities, where and how students of Haliç University spend their leisure time based on their economic and social characteristics and also to reveal reasons for inability of student to participate adequately to recreative activities. At the end of the research, solution suggestions regarding to the actions to be done in order to direct the individuals to active recreation activities instead of participating to passive activities.

**OP-369**

**The Effects of the Electronic Payments on Monetary Policies and Central Banks \***

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The aim of the study is to define the possible effects of electronic payments, which are distinct from conventional payment systems, on central banks and their policies. Since the existence of civilizations, many different values are used for exchange of commodities, goods and services. Through long ages commerce actualized in the form of barter trade of goods. After the invention of money by Lydian's in the 5th century B.C, common values has been started to used such as gold and silver. By the development of modern economics theory, banknotes which is easier to produce, has been started to use instead of precious metals. The monetary value of the banknotes and mintage responsibility were transferred to the central banks. These central banks are tasked with controlling the monetary policies, generally with the goals of economic growth, price stability and stability of financial systems. Last years, the developing understanding of money is completely different from traditional money and doesn't control or produce by central banks. However it serves as money as it satisfies, the technical properties of money: it's durable, divisible, fungible, easy to transport and impossible to counterfeit. Also users are able to reach and transfer electronic money without intermediaries. Electronic money is produced and secured by internet codes. Despite the complicated matrix codes, still there are doubts on its security. Some countries prohibited their usages as a policy. The most popular electronic money currencies are Bit coin, E-Cash, Visa, PayPal and Check- Free all over the world.

**OP-370**

**Protecting Infant Economies, Balkans Economies \***

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The paper explores the objective behind the main aim that EU candidate countries of Western Balkan should consider before being a member of EU. Although the statistics shows that the macroeconomic performance of this countries regarding to GDP increasing and FDI increasing, it cannot be sad the same for well being of this countries. It is seen that during the crisis of 2009 even though the GDP of Western Balkan countries is positive, it is also seen that it is the poor people that most share the crisis's consequences. The increase of FDI plays an important role in economy but in those countries FDI excludes the transfer on knowledge. Even though for government the revenues and employment generated by FDI is justified, most of the foreign firms do not have externalities on transferring knowledge in these countries. This means that those two variables do not necessary result in an increase of well being. The policy makers that aspire to be member of EU should accompanies the integration process with a different perspective of their countries. Higher GDP does not necessarily mean growth and benefit, it can misguide them. Being a member of EU may cause destroy of jobs and this process should be

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accompanied by policies that lead to job and enterprise creation. Citizens should have a different approach of well being as a member of EU, which means both social and economic transformation is necessary. Their voice, creativity and dignity achieved by knowledge will lead to well being as EU members. The policy maker should conceptualize their aim and policies of their countries as market on their own, do not ensure this.

**OP-371**

**Efficiency Comparison of Participation and Conventional Banking Sectors in Turkey Between 2007-2013 \***

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Efficiency Comparison of Participation and Conventional Banking Sectors in Turkey Between 2007-2013

The reason of paying attention to the relative efficiency of banks will differ in conjunction with the perspectives of related parties such as regulators, customers, managers, and stakeholders. Within this context, banking is an over regulated sector by governments. It means that banks operate their functions in compliance with these frameworks. Banking sector is also enormously sensitive against economic changes that lead to the fragile side of the economy. Hence, from the regulators' perspective, inefficient banks are riskier and have more probability of failure. Further, the efficiency of banks is in relation with the productivity of the economy is an issue. Without a sound and efficiently performing banking system, the economy cannot perform smoothly and efficiently. Due to their theoretical conceptualisation and operational differences, Islamic and conventional banks may financially perform in a different way; and hence efficiency scores and their explanatory variables of each can be differentiated in terms of operational and external factors, such as size, competition, input and output quality, risk, asset quality, leverage intensity, management characteristics and profitability. This paper hence aims to focus on Participation banks (PBs) or Islamic and conventional or Deposit banks (DBs) in Turkey by examining their efficiencies and the determining factors of the observed efficiencies in a comparative manner. Capability of savings and the degree of channelling into investment are also important for Turkey. This research aims at measuring and comparing the technical, pure technical, and scale efficiencies of Participation (Islamic) Banks (PBs) and Conventional Deposit Banks in Turkey using by using Data Envelopment Analysis (DEA) for the period of 2007-2013 with a sample of 4 PBs and 28 DBs.

**OP-372**

**Application of a Hybrid Method in the Financial Analysis of Firm Performance \***

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Multi-criteria decision making methods are extensively used in decision making problems. Decision making is the process of selection of the best option among other alternatives. To classify companies by their financial performances is also considered as a decision making problem. This study compares the financial performance of seven large scale companies listed on the BIST Corporate Governance Index for years from 2009 to 2012. The PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluations) and the AHP (Analytic hierarchy process) methods are used in a hybrid structure to evaluate the financial performance and to decide on the best performing firm for the 4 year period. The calculation of financial performance measures is based on six main criteria and fifty sub-criteria. Our study suggests that TUPRS Joint Stock Company (JSC.) has the best financial performance compared to other companies.

OP-373

**Analysis of Performance Regional Public Hospital; Used the Regulation of the Minister of Health no.1171/Menkes/Per/VII/2011, The Balanced Scorecard, and Intellectual Capital Approach \***

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Performance refers to view of implementation of achievement level of activities/ programs/ policies in order to reach the target, goals, vision, and mission of organization. This study aims to assess the performance of the Regional Public Hospital of dr. Rasidin (RSUD dr. Rasidin) which is an asset of Padang local government. The performance of RSUD dr. Rasidin was assessed with three approaches based on the Regulation of the Minister of Health no.1171/Menkes/Per/VII/2011, the Balanced Scorecard approach, and Intellectual Capital approach. Data used in this study consists of primary and secondary data as well as qualitative and quantitative data. Methods of primary data collection using questionnaire, respondents consist of customers and employees. Sampling method is a non-probability sample that is using accidental sampling. Variables Measurement of Intellectual Capital performance uses the Pulic method (1997). The method of analysis descriptive comparative analysis. The results showed that in 2011 and 2013 RSUD VAIC were negative, but positive in 2012. BSc Performance based on revenue growth has increased from 2011-2013, TATO in 2013 decreased. Expenses decreased, the target and actual revenue was decreased. From the customer's perspective, customer acquisition has increased, especially for out patient services. Customer satisfaction is also quite high. On the internal business perspective has increased, and from the growth and learning perspective, productivity of employees was increase and employee retention was high.

OP-374

**Micro-Electro-Mechanical System (MEMS)-Based Piezoelectric Energy Harvester for Ambient Vibrations \***

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The ambient vibration-based micro electromechanical systems (MEMS) piezoelectric energy harvester has become an important subject in most research publications. Providing a green and virtually infinite alternative power source to traditional energy sources, this harvester will significantly expand the applications of wireless sensor networks and other technologies. Using piezoelectric materials to harvest the ambient vibrations that surround a system is one method that has seen a dramatic rise in the power harvesting applications. The simplicity associated with piezoelectric micro-generators makes them very attractive for MEMS applications in which ambient vibrations are harvested and converted into electrical energy. These micro generators can become an alternative to the battery-based solutions in the near future, especially for remote systems. In this paper, we proposed a model and presented the simulation of a MEMS-based arrayed energy harvester under ambient vibration excitation using the coventorware approach. This arrayed cantilever-based MEMS energy harvester that operated under ambient excitation of frequency band ranged from 67 to 70 Hz, within a base acceleration of 0.2 to 1.3g produces an output power of 6.8  $\mu$ w and 0.4 volts at 20.1 k-ohms connected load.

OP-375

**Optimal Control and Analysis of Three Phase Electronic Power Transformers \***

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Transformers are widely used in the electrical power systems. However, transformers are one of the most expensive component in the power systems. In recent years, by the rapid development of microprocessor and power semiconductor technology, a new kind of transformer has emerged. These transformers are called as an electronic power transformer (PET). In this study, The proposed PET consists of three stages such as input, isolation and output stages. Three phase space vector pulse width modulation based rectifier is used input stage of PET because of its high power factor, sinusoidal ac current and fast dynamic response. Voltage of this rectifier is controlled by Fuzzy-PI controller. Then, Proposed PET system is evaluated in terms of unit power factor and total harmonic distortion (THD).

OP-376

**Investigation of TCSC Controller Effect on IDMT Directional Over-current Relay \***

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With the presence of FACTS controllers in power system transmission for enhancing the power system controllability and stability. Power system protection performs the function of fault detection and clearing as soon as possible, IDMT directional over-current Relay one of the most important protection systems of transmission lines, its function would generally be changed in presence of FACTS devices. In this paper a study for obtaining the direct effect of the varying reactance of the TCSC with firing angle alpha on short-circuit parameters of three phase fault and DOCR operating time. The simulation of the linear programming techniques is performed in Matlab software environment. The case study is compared between compensated and uncompensated system.

OP-377

**Comments on "Non-linear Piezoelectric Vibration Energy Harvesting from a Vertical Cantilever Beam with Tip Mass" \***

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This paper first points out the retaining higher order terms in the main equation of the paper of Friswell et al. (Journal of Intelligent Material Systems and Structures 23(13): 1505–1521, 2012). The equations of motion for the system are derived following energy (Lagrange) based approaches and the correct equation with the extra higher order terms is provided and simulations are redone in the current study (CS).

OP-379

**Suspended Solid, Color, COD and Oil and Grease Removal from Biodiesel Wastewater by Coagulation and Flocculation Processes \***

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Coagulation and flocculation are essential processes in a number of diverse disciplines, including biochemistry, cheese manufacturing, rubber manufacturing, and in water and waste water treatment. Coagulation-flocculation is effective for removing high concentration organic pollutants and heavy metals in water and wastewater. However, limited information exists on the efficiency of this coagulation-flocculation process for biodiesel wastewater treatment. The biodiesel wastewater is basic (alkaline), with a high content of oil and grease, and a low content of nitrogen and phosphorus. As such, biological treatment of the biodiesel wastewater is expected to be very difficult. For this reason supportive physico-chemical methods are often used. Although one of the most frequently employed method is coagulation. Therefore, this study was conducted to investigate the efficiency of coagulation and flocculation processes for removing suspended solid (SS), color, COD and oil and grease from biodiesel wastewater. Aluminum sulfate, polyaluminum chloride, ferric chloride and ferric sulfate as a coagulant in biodiesel wastewater treatment were studied using a standard jar test apparatus. The result shows that, at the optimum dose of PAC (300 mg/L), the percentage removal of SS, color, COD and oil and grease respectively 97%, 95%, 75% and 97% compared to only 92%, 92%, 53% and 99% at the optimum dose alum (500mg/L), 95%, 93%, 63% and 97% at the optimum dose of ferric chloride (350 mg/L) and 88%, 88%, 54% and 94% at the optimum dose of ferric sulfate (450 mg/L). The effect of coagulant dosages on suspended solid (SS), color, COD and oil and grease removal showed similar trend and PAC was found to be superior was observed at reasonable lower amount of coagulant i.e. 300 mg/L. The results showed that coagulation-flocculation is effective as a pre-treatment for treating biodiesel wastewater.

OP-380

**Wireless Mobile Robot Control with Tablet Computer \***

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In this study, a mobile robot carrying an on board camera is designed and implemented, which can be controlled remotely with wireless technology. Android operating system based tablet computers (controller) control mobile robot remotely and one android interface program is designed for remote control. Mobile robot is a microcontroller based embedded system and its hardware works on Linux operating system. Mobile robot and controller communicate with Wi-Fi communication (socket communication). Mobile robot's camera takes video continuously and sends it to controller screen. These video contents are examined by the controller user; speed and direction information are entered from touch screen and these information are sent to mobile robot. In this manner, mobile robot movement is provided. Mobile robot motion is handled by direct current (DC) motors controlling and it is achieved with Pulse Width Modulation (PWM) method.

System consists of two interrelated systems. One interrelated system is mobile robot part and the other is controller part. Mobile robot works as a server and controller works as a client. Observed video, which are taking from on board web camera, send from server to client wirelessly. Client takes video and shows it on screen. User can control the mobile robot by setting direction and speed from android tablet. Entered information sent to server and server sets motion parameters by using this information.

Real-time video transportation is achieved with Motion Joint Photographic Experts Group (MJPEG) on Linux operating system. Because of the system performance, captured video is not saved. In client side (controller), speed is

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arranged 0 to 100 and for motion, user can set direction to left, right and direct. On controller application screen, user can see entered speed and direction values by the animated images.

OP-381

**Comparison of Different Performance Measures of Complex Product Systems in Technology Forecasting \***

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Technology forecasting is estimating the future value of characteristics and performance of a technology. Since technologies are embedded in products, different measures of these products can be used in technology forecasting. Two classes of data play a central role in technology forecasting studies. In the first class, publications and patents are commonly accepted measures as indicators of scientific and technological performance. The second class is the performance data of the "technology in use". In this second type of data, performance is usually characterized by multiple parameters in a complex product system since these product systems are the aggregates of sub-systems and system level performance measures are also aggregates of numerous technologies. Technological progress obtained by these two types of datasets may show different patterns. Also each parameter of the overall system may show different pattern either. Authors claim that, in order to improve the quality and decrease the uncertainty of technology forecasts, both datasets should be studied. A multidimensional technology life cycle should be considered before taking managerial decisions. In that study a case study in a refrigerator system has been performed to support authors' claim. Three types of datasets, patents from first type of dataset; coefficient of performance (COP) and energy efficiency index (EEI) from second type of dataset are used. Different life cycles and different scenarios of the same system are obtained using growth curves as a technology forecasting tool. The findings are discussed and the proposed model of using measures in technology forecasting is explained in detail.

OP-382

**Radio Frequency Identification (RFID) Based Attendance & Assessment System with Wireless Database Records \***

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In the modern era, great developments have been done; which are based on Radio Frequency Identification Techniques. The applications are effectively applied to various diverse areas as transportation, agriculture, hospital / health care and other industries. RFID technique facilitates use automatic wireless identification through electronic passive and active tags with suitable readers. This paper illustrates a physical system which incorporates an application of RFID and wireless data base record entries. Our proposed system not only eliminates the time consumed in manual attendance but also maintains the record of entries which can be used for statistical purposes like allocation of appropriate attendance score and further administrative tasks.

OP-383

**Expert System on Selection of Mobility Management Strategies Towards Implementing Active Transport \***

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This paper presents the development of an expert system designed to train the young professional to implement mobility management strategies in order to influence a shift from passive to active transport choice which is cycling and walking. One of the processes involved in knowledge acquisition of active transport strategies is to capture the views of transportation experts regarding

the most appropriate strategies with regards to the shift from motorised transport to active transport. There are eight (8) main transportation planning objectives to be achieved in organising an active transport system, such as congestion reduction, road and parking cost reduction, consumer cost reduction, crash risk reduction, air and noise pollution reduction, energy conservation, economic development benefits and liveable communities. Furthermore, apart from the main objectives, specific objectives on mobility management strategies are divided into four (4) major categories according to how they affect travelling, including improvements in transport option, land use management, price incentive and other implementation programs. Based on these, an expert system shell is developed to achieve the purposes highlighted above by using Visual Basic.NET as a tool and MySQL as a supporting tool. The expert system would finally provide an advice on the best strategy to be implemented based on the selection of the main objective and the specific objective by the user.

## OP-384

### Geothermal Energy for Residential Power and Heat Co-Generation ✱

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Nowadays the environmental pollution is one of the main concerns worldwide going next to the preoccupation to ensure the energy consumption of the modern world continuously increasing. One solution to this issue is the energy generation using renewable sources, especially considering the classic energy sources being limited and the unfavorable availability forecast for coal, natural gas and oil. The paper is structured in five chapters and addresses a topic related to the exploitation of renewable energy sources to generate heat and power using modern and sustainable solutions in order to reduce the environmental impact by facilitating greenhouse emissions savings.

The first chapter presents general considerations related to the solutions to generate heat from geothermal energy providing brief information about an existing geothermal system in West side of Romania, underlines the importance of the main topic and the current concerns.

In the second chapter are evaluated the geothermal system's performance indicators based on the real energy audit.

The third chapter shows an eco-friendly and financial efficient solution to exploit the geothermal potential for co-generation of heat and power, being presented the optimized energy balance and new performance indicators. In the fourth chapter are given economical appraisal results of the geothermal co-generation investment and the last chapter indicates the final conclusions.

## OP-385

### Optimal Load Shedding Strategy for Selçuk University Power System with Distributed Generation ✱

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Traditionally under frequency relays and PLCs (programmable logic controller) are used for load shedding. Recently, these methods have been combined with smart power management systems to shed load automatically. These combined systems are best methods. However, shedding exact amount of load is almost impossible, because it usually ends up with excessive or inadequate load shedding at feeders where it becomes necessary to sustain system stability. Disconnecting a certain amount of loads at a feeder is defined as load shedding. In case of emergency, faster and optimal load relief can be obtain with an intelligent load shedding system. This paper demonstrates an intelligent load shedding strategy in electrical system of Selçuk University Medical Faculty consisting different type and size of loads and being supplied by a distributed generator. Generators which supply with Selçuk University Medical Faculty can't meet energy requirement when there is any disturbance in power system. In case of 1 MW Solar power plant to be building at University Campus supply to Medical Faculty, the difference between power generation and demand will decrease. In this case, load shedding becomes necessary to improve reliability of power supply and sustain system stability. Loads are sorted by importance priority and optimal load shedding method is applied. The fuzzy logic is employed for optimal load shedding solution. Strategy is applied on Medical Faculty loads which have different importance level.

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## OP-386

### Comparison of Edge Detection Algorithms for Texture Analysis ✱

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In the recent years, economic and technological developments had a positive impacts on the automation systems that are used in industry. When traditional methods were used in production and quality-control systems, nowadays automation systems and machine vision systems are used. Production quality with the supported by machines is more advantageous than is done manpower. Based on this idea, inspection of glass surface which have quite challenging properties for human eye must be performed using machine vision. Because quality-control systems using machine vision is specifically designed for inspection material. So, measurement result are not affected by undesirable factors such as fatigue, characteristics of using material. In this study, production defects of glass such as scratches, bubbles, surface deformation, cracks, fractures are examined with camera. Firstly, the glass enter measurement device that is isolated from external medium and is illuminated with fluorescent lamps. The camera is placed in front of glass and it captures images when glass moving. The images captured by the camera must be analyzed quickly. Cellular Neural Network (CNN) algorithm which is very fast method has been used for it. 3x3 templates are applied images. These templates are trained for surface analysis using genetic algorithm. 10 pieces glass were used in the experiments. Some of these glasses are cracked, some of them are broken, some of them scratched and others standard. These glasses were tested by the developed system and successful results were obtained.

## OP-387

### Amino Acid and Fatty Acid Profile of the Mare's Milk Produced on Suisamyр Pastures of the Kyrgyz Republic During Lactation Period ✱

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The high nutritional and health-promoting properties of kymyz, a traditional drink of nomads produced from mare's milk, are well-known and reported in literature. The composition of mare's milk is significantly different from that of cow and other ruminants. Fatty acid composition and amino acid profile of mare's milk produced at Suisamyр pastures of Kyrgyzstan were studied during four lactation months (May, June, July and August). The amino acid composition was determined by precolumn derivatization with diethyl ethoxymethylenemalonate in high-performance liquid chromatography and 18 amino acids were determined in mare's milk. Most abundant amino acids were glutamic acid (16.8-21.2%), leucine (8.2-10.1%), lysine (8.9-10.1%) and ornithine (0.1-0.7%) was in a small amount. The percentages of essential amino acids in protein of mare milk were 46%, 46%, 51%, 48% for May, June, July and August months respectively, which demonstrate the high biological value of milk during all milking season. The fatty acid contents of the milk fat were determined in the form of fatty acid methyl esters by gas chromatograph, after methylation with potassium hydroxide in methanol. The concentrations of capric (10:0), lauric (12:0) and myristic acid (14:0) were similar during four lactation months and the concentration of linoleic acid (18:2) was higher in July month. The results of the study have shown that the highest contents of the nutritive compounds were found in the mare's milk obtained in July.

## OP-388

### Triz Methodology and an Application Example for Product Development ✱

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Explanation of innovative products, processes and services is a complex process which is possessed of strategies that have modern designs and systems. Nowadays, companies want to be more productive and more efficient. However, rapid and big changes are happened in competitive conditions and to

exist in this competitive and rapidly changing and flourishing world, scientific developments had to be followed. To gain competitiveness, the companies need to procreate new products or eliminating the existing contradictory states. In this case, TRIZ (Theory and Innovative Problem Solving) methodology is one of the most effective scientific method, used by managers or inventors. In this study, TRIZ methodology was described in detail with creativity and innovation concepts and TRIZ was presented in comparison with other creative techniques. In the last part, a sample about TRIZ application has been expressed.

**OP-389**

**Corrosion Behaviour of Eutectic Molten Salt solution on Stainless Steel 316L \***

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The effect of eutectic molten salt on the corrosion behavior of a stainless steel 316L was investigated. To be used as thermal energy storage fluid, low melting point is one of the utmost important thermal properties amongst other. Eutectic salt was defined as a combination of two or more salt at different composition producing lower melting point than of it purest form. Four types of salts, sodium chloride (NaCl), potassium nitrate (KNO<sub>3</sub>), lithium nitrate (LiNO<sub>3</sub>), and sodium nitrate (NaNO<sub>3</sub>) were used to form fifteen mixtures of different composition to be tested on SS316L. The composition based on weight ratio was generated using response surface methodology (RSM). Eutectic composition of molten salt used as thermal energy storage fluid can possibly affect the corrosion occurrences due to the existence of Cl<sup>-</sup> ion and thereby influence the lifespan of the 316L stainless steel. This study indicates that the compositional different of eutectic mixture significantly affected the lifespan of the 316L stainless steel against corrosion. Two types of approaches are used in describing the corrosion behavior, which are resistance potential, Rp and corrosion rate. After test of 24 hours in total immersion condition, 316L stainless samples have developed a scale of corrosion products made up of multiple oxides. Highest proportion of NaCl salt inhibits higher corrosion rate in eutectic molten salt as observed in resistance potential value and corrosion rate. Morphology of the stainless steel SS316L was further investigated under scanning electron microscope (SEM).

**OP-390**

**Biosorption of Mn(II) ions from Aqueous Solution by *Pleurotus Spent Mushroom Compost* in a Fixed-Bed Column \***

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The *Pleurotus* spent mushroom compost have been identified as a low-cost biosorbent for heavy metals removal. The Mn(II) ions removal from aqueous solution by *Pleurotus* spent mushroom compost was conducted in a fixed-bed column. The effect of various parameters such as flow rate, bed depth and initial concentration on Mn(II) ions biosorption were investigated. The results of breakthrough time, exhaustion time as well as the Mn(II) uptake and percentage of removal are highly influenced by the flow rate, bed depth and the initial Mn(II) concentration. The results demonstrated that the breakthrough time and exhaustion time increased with decreases of flow rate and initial Mn(II) concentration and increase of bed depth. In order to determine the sorption kinetic parameters and to predict the breakthrough curves, the Thomas and Yoon-Nelson models were applied to the Mn(II) biosorption. The SEM/EDX results confirmed that the Mn(II) ions presence on the surface of *Pleurotus* spent mushroom compost after biosorption process and the FTIR identified the carboxyl, hydroxyl and amide functional groups as the active binding sites for Mn(II) ions biosorption.

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**OP-391**

**Measure of the Chloride Permeability of the Pozzolana Concrete in Sulphate Middle \***

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The natural pozzolan of volcanic origin has a marked influence on the physico - mechanical characteristics of the concretes. When it is coupled to a water reducing superplasticizer by a correct adjustment of the composition, it greatly improves the concrete properties. The analysis of the experimental results on pozzolana concrete at 5% content and fineness of 9600 cm<sup>2</sup>/g, in a sulphated environment, showed that it contributes positively to the improvement of its durability with respect to the Chloride permeability. This test was performed using the procedures of ASTM C 1202. The resistance of concrete to penetrating chloride ions was measured by the charge passed through two 50 mm disk concrete specimens maintained under an electric tension of 60V during 6 hours by means of electrodes made of rustproof steel between the two cells of the two compartments. One of the faces of the specimen was in contact with 3% NaCl solution, and the other face was in contact with 0,3N NaOH solution. The test was conducted at 28, 90,180 and 365 days.

**OP-392**

**New Developments of Neutron Activation Analysis Applications \***

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Neutron Activation Analysis is the most sensitive analytical technique used to determine concentration of elements in a sample. Methods of neutron activation analysis have been known for quite a long time, since 1936. However, active development of this method in its technological applications has been started together with recent developments of powerful and safe sources of neutrons, precise and fast gamma detectors, high speed electronics, increased processing ability of the computers and growing demands for industrial processes automation quality control. We discuss as these latest developments influenced performance and utility of different Neutron Activation Analysis techniques and first of all accuracy and stability of analytical results. As a result of the mentioned improvements wide variety of neutron analysis devices has been employed recently for reliable and precise control in cement and coal industry, borehole logging, security monitoring, industrial elemental analysis for production automation and quality control, nondestructive testing. Company RatecLab Ltd develops universal detection system of high resolution gamma spectroscopy for tagged neutron analysis with time-of-light filtering (Skolkovo Grant 2014-2015). Such high resolution detection platform would address the shortcuts and problems associated with conventional detection systems that utilize detectors with relatively low resolution prone to high background problem and slow response time. We perform thorough research of new potential applications of such precise and fast Neutron Activation Analysis system for some unresolved demanding problems of industries such as gas and oil industry. In our opinion there are multiple new possibilities to apply systems with neutron interrogation for industrial production control, nondestructive pipe inspection, neutron radiography etc.

**OP-393**

**Determination of 4'-Hydroxyacetanilide in Leaves Extract of *Aquilaria Malaccensis* by High Pressure Liquid Chromatography (HPLC) \***

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In this study determination of a compound commonly known as acetaminophen in the leaf extract of *Aquilaria malaccensis* was studied and discussed. *Aquilaria* species are well known for its valuable agarwood. Acetaminophen or

4'-hydroxyacetanilide in its synthesis name is the main compound found in synthetic drugs. This synthetic drug is referred in treating fever, migraine and other type of illness. It is known that *Aquilaria* species able to treat various illnesses, including fever in which the leaves is treated as tea and believed to cure many other illnesses. A simple and validated method was developed for the study of 4'-hydroxyacetanilide by High Performance Liquid (RP-HPLC). This analysis is well conducted with C18 column to separate the compounds. The method is validated with different parameters in terms of linearity, range, accuracy and robustness. The mobile phase used in this study is acetonitrile and water (20:80). The pH was adjusted to 3.5 with the aid of orthophosphoric acid. The flow rate was set to 0.8 ml/min and a spectrophotometric condition at 193 NM. The percentage of recovery from this method is within 98% to 101%, which indicates this method is reliable and can be applied to an analysis of 4'-hydroxyacetanilide from *Aquilaria malaccensis*. The concentration of 4'-hydroxyacetanilide determined in the leaves extract of *Aquilaria malaccensis* at 60°C were 0.807-1.1µg/ml, 1.398µg/ml and 1.811µg/ml.

**OP-394**

**Drying Kinetics of *Nephelium Lappaceum* (Rambutan) in a Drying Oven \***

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*Nephelium Lappaceum* (Rambutan) is a local seasonal fruit that has a short storage life. In this study, the effects of temperature on the drying of *Nephelium Lappaceum* samples were investigated. The present investigation was conducted at drying temperatures of 40°C, 50°C, 60°C, 70°C and 80°C for 24 hours, and the drying kinetics of *Nephelium Lappaceum* were evaluated. The experimental data were fitted to five thin layer mathematical models, including the Lewis, Page, Handerson and Pabis, logarithmic and two-term model. These models were evaluated by comparing the coefficient of determination (R<sup>2</sup>), chi square (χ<sup>2</sup>), reduced sum square error (SSE) and root mean square error (RMSE). The logarithmic model best fit the experimental data. The effective diffusivity, D<sub>eff</sub> was calculated using Fick's diffusion equation, and the value of D<sub>eff</sub> varied from 1.34E-10 to 4.36E-10 m<sup>2</sup>/s. The activation energy, E<sub>a</sub>, and diffusivity constant, D<sub>0</sub>, were 24.99 kJ/mol and 2.23E-6 m<sup>2</sup>/s, respectively.

**OP-395**

**Selection Strategy Via Analytic Hierarchy Process: An Application for a Small Enterprise in Milk Sector \***

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Strategic structure for decisions hierarchically is to obtain the goal of the decision at the top, basic strategic purposes in the higher levels, evaluation criteria in the middle, and alternative choices at the bottom. Organizational structures which are dynamic, process-centric, strategy-oriented, and trust-based come up as key for competitiveness for every level enterprises. The basic efficient for the system and the link between business strategic management is that focusing increases can be fractional and at least be correlated with, the relative value of contribution during the period for enhancement AHP (Analytic Hierarchy Process) is a method as needed for the benefit of the structure as tool of multi-attribute decision theory. The aim of this study to determine the best strategy and the development of small business management via SWOT (Strengths, Weaknesses, Opportunities, Threats), and AHS 's is used in combination. For this purpose, SWOT analysis will be implemented for a small scale enterprise in the food sector (milk factory) and alternative strategies will be determined that are based on SWOT factors. And then the SWOT matrix is converted into a hierarchical structure. AHP model will be built and try to generate the general structure for enterprise. Finally the model structure will be solved with AHP method.

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**OP-396**

**Study of Interactions Mixtures (Biodegradable Polymer / Active Ingredient) Obtained by Different Methods of Preparation**

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Medicines are often hydrophobic which may pose oral absorption during digestion problems. The complexation of the active ingredients can better control their passage into the bloodstream or escalation dissemination and protection and stability when highly reactive or so increase their solubility when they are poorly soluble in circles aqueous. Cyclodextrins are polymeric materials commonly used as excipients in medicaments, in particular they allow to convert liquid compounds in solid (powder, tablets) by precipitation of inclusion complexes. The bioavailability of these hydrophobic molecules is therefore improved by. Cycloamylose this matrix was used for the preparation of inclusion complexes using a nonsteroidal anti-inflammatory namely niflumic acid whose solubility is very limited in an aqueous medium. Mixtures obtained by different methods of preparation have been demonstrated by analysis: FTIR, XRD, and UV-vis. In this study we sought to improve the solubility of niflumic acid and to determine the effect of their inclusion in the behavior of the environment supporting matrix acid. We conducted the study of the kinetics of dissolution of different mixtures (niflumic acid, cyclodextrin) and established the mathematical modeling of the release profiles.

**OP-397**

**Chemical Compositions of Essential Oil and Variations in Antioxidant Constituents and Properties in Different Organs of *Stachys byzantina* Grown in Turkey**

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Mountain tea (*Stachys byzantina*) is a plant of great medicinal importance in Turkey. To provide experimental evidence for the antioxidant activity and constitutes of Mountain tea, different organs, including stems (SBS), flowers (SBF), leaves (SBL), root (SBR) and aerial parts (SBAP) were evaluated. Antioxidant activities of the methanolic extracts of different organs and essential oils (EOs) were evaluated using the thiocyanate method. We also demonstrated that the total phenol contents (TPCs) and the total flavonoid contents (TFCs) and considerable differences were found in phenols and flavonoids in methanolic extracts of different organs of *S. byzantina*. TPCs varied from 17.9±0.87 to 315.8±2.34 mg gallic acid equivalent/g dry mass. TFCs were between 6.76±1.97 and 198.13±0.56 mg quercetin equivalent/g dry mass. Isoscutellarein 7-O-[β-D allopyranosyl-(1→2)-6''-O-acetyl-β-O-glucopyranoside] and 4'-O-Methyl Isoscutellarein 7-O-[β-D-allopyranosyl (1→2)-6''-O-acetyl-β-O-glucopyranoside] were the major flavon glycosides in the SBAP (1165.77±3.02 and 972.43±1.65 mg/kg dry mass), SBF (713.61±0.12 and 457.87±4.03 mg/kg dry mass), and SBL (3018.73±2.91 and 1763.80±4.65 mg/kg dry mass) organs and quantified 89.1±1 and 289.5±5 µg in the extracts, respectively, using the high-performance liquid chromatography analysis. Apigenin 7-O-β-D-(6''-trans-p-coumaroyl) glucoside was also obtained. Gas chromatography-mass spectrometry (GC-MS) analysis of EOs revealed the presence of main compounds, oxygenated monoterpenes, cis-p-mentha-2,8-dienol (23.68%), trans-chrysanthenyl acetate (12.41%) and thymol (10.12%). The results of the present investigation demonstrated significant variations in the antioxidant activities and constitutes in methanolic extracts at different organs of *S. byzantina* grown in Turkey and may be used for developing functional foods, in this way provides significant health benefits.

OP-398

**The Multi-Faceted Consequences Carried by Turkey's Participation to the European Union's Framework Programmes for Research and Technological Development**

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Since 2002, Turkey is associated to the EU's framework programmes. Indeed, the association bestows Turkish private sector and academic community with the opportunity to receive funds from the EU and serves the government's objective to boost the industry -and, consequently, to improve the employment figures. Because Turkey's R&D expenditures in comparison to her GDP is under the EU's average, such a support can only be welcome. Participating in the framework programmes provides for at least two more benefits for Turkey. One of them is related to Ankara's perception of being considered as a true candidate for accession. Although the candidacy status has been given in 1999 and accession negotiations started in 2005, the problematic status of Turkey does not give a clear view of membership. For Turkey, framework programmes potentially justify the prospect membership by providing a solid platform of partnership. The second aspect concerns the possibility to depict Turkey as a contributor to the general well-being of the EU through scientific cooperation. In fact, the chapter on Science and Research is the only one that is provisionally closed in accession negotiations. It is therefore a particular field where the level of Turkey's alignment with the EU is high. Ankara does not consider itself as a mere consumer of funds, but an actor that plays a part in job creation.

OP-399

**The Impact of Virtual Chemistry Laboratory Instruction on Pre-Service Science Teachers' Inquiry Skills**

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Laboratory is a central component of science education. With the development of technology, virtual laboratory instruction has become an alternative learning environment to overcome disadvantages of conventional laboratory. In this study, it was aimed to investigate the effect of virtual chemistry laboratory (VCL) instruction on first grade pre-service science teachers' inquiry skills. For this purpose, eight VCL activities were developed according to ADDIE instructional models in the context of General Chemistry course. VCL was reviewed by two chemistry educators and one computer educator and then it was piloted with five pre-service science teachers. Instructions were conducted by participation of thirty-four pre-service science teachers, which were randomly assigned to experimental (N=17) and control groups (N=17). While laboratory instruction was performed via VCL activities in the experimental group, the same activities were performed in conventional laboratory environment by control group students during eight weeks. Inquiry Skills Scale developed Aldan-Karademir and Saracaloğlu (2013) was used before and after the instructions for data collection. According to Mann-Whitney-U test results, while no significant difference between pre-test mean scores was found (U=137.500, p>0.05), there was a significant difference between post-test mean scores (U=65.000, p<0.05) in favour of experimental group. Moreover, while no significant differences between pre-test mean scores for each sub-dimensions were found, significant difference between post-test mean scores for sub-dimension named acquisition of knowledge skills was found (U=53.500, p<0.05) in favour of experimental group. In addition, Wilcoxon Signed Ranks test results for each sub-dimensions indicated no significant differences between pre and post test scores of control group and significant differences between pre and post test scores of experimental group (instead of self-confidence). Results underlined that VCL instruction is more effective for promoting pre-service science teachers' inquiry skills.

OP-400

**Modelling University-Industry-Government Interactions in Kazakhstan**

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Effective governance of university-industry interactions fosters creation and dissemination of new knowledge in an economy. However, the nature of such interactions as well as the role of the government is not yet deeply studied in Kazakhstan. Therefore, the purpose of the paper is to create a model of university-industry-government interactions which would visually depict the roles of each agent in the process of knowledge creation and dissemination. The paper focuses on the study of interactions in the telecommunications sector which has been identified as one of the priority sectors for Kazakhstan's innovative development. The data for the study was collected through surveys and face-to-face interviews with the representatives of universities and business sector. Overall, the sample covered 28 universities and 52 telecommunications firms with the response rate of 92% and 54%, respectively. The model was built based upon the answers of the respondents as well as existent literature on governance, state programs and legislative documentation of Kazakhstan. The model considers the role of each agent involved in the knowledge transfer process and specifies the barriers that the participants face. The main factor hindering university-industry interactions in Kazakhstan is the absence of any government policy aimed to stimulate companies to collaborate with universities. University-industry interactions are basically informal and occur through traditional channels such as recruiting students/graduates and participation in conferences/seminars. The government's role is limited to provision of research grants to universities and tax deductions to companies involved in R&D. The findings of this study contribute to the literature by modelling university-industry-government interactions in Kazakhstan and identifying the loopholes of the current system.

OP-401

**The Use of New Media in Crisis Communication: A Case Study of Gallon Bottled Water Crisis in Turkey**

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The use of new media come into prominence with globalization, not only in promoting a brand but also in managing the crisis, new media started to have an important role for companies in order to reach their target audience. Since new media provides fast access, to get feedback from the target group in a short time and its success in reaching the target group could be measured, it is known that in addition to traditional media, most of the companies prefer to use new media in order to communicate with their audiences during crises. From this point, the aim of this research is to explore the types of use of new media during crises. As a case study, the crisis which emerged after human and animal faeces were found in the samples of drinkable water taken from gallon bottled waters chosen. After the names of the companies listed both on the internet and traditional media by the Ministry of Health in July 2012 in Turkey, the relevant companies tried to show that they are innocent by using different communication channels. As a part of this research, among the fifteen companies whose names announced, the ones which have corporate web pages chosen as a sample and these companies use of social media during crisis is evaluated through content analysis.

OP-402

**Investigation of Teachers' Individual Innovativeness Levels and Lifelong Learning Competencies**

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Education is the most basic phenomenon that has the power of renovating and changing the community and shaping current social, political posers and ideas by taking them under control. At the same time, it is one of the most important development sources that accelerate social and cultural development. Learning to learn and self-management in the context of innovation, creativity, entrepreneurship and lifelong learning are listed as a must have basic skills of individuals in the 21st century. Therefore, lifelong learning competencies and innovativeness levels of teachers who are among the important actors of the education process are expected to be high. In this context, the investigation of the individual innovativeness levels and life-long learning competencies of teachers working at high schools according to various variables and the determination of the effect of their life-long learning competencies over their innovativeness levels are aimed in this study. The study group of the research consists of 321 teachers working at the high schools located in the province of Mersin. In the study, "Individual Innovativeness Scale" translated into Turkish by Kılıçer and Odabaşı (2010) and "Life-long Learning Efficacy Scale" developed by Uzunboylu and Hürsen (2011) were used as the data collection tool. Descriptive statistics were used in the determination of the individual innovativeness levels and life-long learning competencies of the teachers. Tests of differentiation among means was conducted in order to determine whether the individual innovativeness levels and life-long learning competencies of teachers differ according to gender and seniority variables. To determine the effect of teachers' life-long learning competencies over their individual innovativeness levels, the Path analysis was performed by using the Lisrel Program. At the end of the research, it was determined that the of teachers were low and that their life-long learning competences were high.

OP-403

**Impact of Technological Change on Bulgarian Foreign Trade with Neighboring Countries after EU Accession**

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The paper reviews the recent data in the field of the foreign trade of Bulgaria with the neighboring countries: Greece, Romania, Turkey, Serbia, FYR of Macedonia, after the accession of Bulgaria in the European Union in 2007. The focus is on the impact of technological change on the foreign trade and the economic growth of the country and on the possibilities for increasing the export and the trade turnover in particular. The development of foreign trade in recent years, especially on the Balkans, has diminished due to the debt crisis and the recession in the European Union. However, some of the countries in the region are not EU member states and the global financial crisis have not affected their economic growth. Thus, the impact of some economic indicators on the foreign trade is crucial for presenting and analyzing the present and future trends in the trade among the Balkan countries, especially in times of implementing technological change in foreign trade. In foreign trade, there are certain obstacles (taxes, fees, regulatory regimes, etc.) that are implemented by the countries. Thus, each state enhances its own export and trade turnover by ignoring the opportunities for technology implementation and its effect on the trade and economic growth in the region. The purpose of the paper is to analyze the present trade turnover of Bulgaria with the neighboring partners and to discuss the effect of technological change on foreign trade. The expected result is to define the opportunities for further development and improvement in the export and import of the goods and services.

OP-404

**Analysing the Importance and the Results of Decent Work Concept in Terms of Labour Market: Case of Turkey**

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Decent work concept has been appeared within the latest reports of International Labour Organization; decent work is very important for the effectiveness of labour market. Decent work impacts on the development of the countries, within the labour market parameters: health, security, wage, employment law, women employment.. In this report, decent work concept will be analysed under the index of Turkey, its effectiveness and ways to solve issues.

OP-405

**Webquest as a Pedagogical Approach in Teacher Training for Technical Education Lecturers in Singapore**

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Developed by Dodge (1995), WebQuest is an inquiry-based teaching tool, in which students of all ages and levels participate in an authentic task that use pre-designed, pre-defined internet resources, though other print resources can also be used. WebQuest takes a problem-solving approach and exhibits a clear structure that guides the learning processes and interactions (Dodge, 2001). In teacher preparation, research has shown that WebQuest enhanced problem-solving skills, higher order thinking, motivation, creativity, critical thinking, active learning, connection to authentic contexts (Abu-Elwan, 2007; Allan & Street, 2007; Lim & Hernandez, 2007) and assisted in bridging the theory to practice gap (Lim & Hernandez, 2007). This study aims to use WebQuest as a pedagogical approach in training technical education lecturers in Singapore in accommodating students with diverse learning needs and special needs. The lecturers were taught to develop a Webquest for their classes on the subject area of their expertise (e.g., accounting, marketing, cosmetics) and were later asked to respond to a survey questionnaire. The survey included (a) the purposes of using internet in lecturers' daily life functions in ranking, and (b) 16 questions with ratings of 4 point scale (strongly disagree, disagree, agree, and strongly agree). Thirty-five lecturers responded to the survey. The data was compiled and the computed. The study has shown that while the majority (90% and higher) of the lecturers viewed Webquest positively in its purpose to promote critical thinking, community based learning, and integration of ICT in their classrooms, a few lecturers (2.9% to 5.7%) consistently viewed Webquest negatively, which may be partially due to the nature of the subject (e.g., practical hands-on or more technical lessons). The limitation and recommendation of the study will be discussed. In addition, this presentation will also share examples of the Webquests developed by the participants in the study.

OP-406

**Panel Data Analysis of The Effects of Entrepreneurship and Innovation on Economic Growth**

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This study aims to investigate the effects of entrepreneurship and innovation levels of the countries on their economic growth. Entrepreneurship and innovation concepts are closely associated with each other by their nature. Entrepreneurs form the base for the economic system by bringing together production factors to realize their creative ideas. The constant and intense competitions force entrepreneurs to be innovative and different. The businesses



that are not strong in innovation and not up-to-date can't survive and leave their places to innovative ones. There are many scientific researches that emphasize the importance of entrepreneurship and innovation for sustainable economic growth. Countries have to promote entrepreneurship and innovation to ensure economic development in today's tough competitive environment. In the study firstly, the concept of entrepreneurship and innovation have been introduced, and current methods of measuring these two concepts are examined. Entrepreneurship and innovation indicators have been chosen in the light of previous studies in the literature and the relationship between entrepreneurship and innovation levels of the countries with economic growth rates has been analyzed by using panel data analysis. The findings of the study indicate the existence of a positive relationship between economic growth and entrepreneurship and innovation levels of the countries. Based on the results of the study, we can conclude that the countries should support entrepreneurship and innovation policies and allocate more resources into innovation.

**OP-407**

**Can Social Business Save the World from Poverty? How?**

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Despite the progress in fighting against poverty, one billion people still live with an income under \$1.25 per a day in the world. This precarious circumstance is acknowledged by actors of the global system as one of the most important socio-economic issues that the societies try to cope with. In this respect, there are many initiatives taken by nation states and institutions both collectively at global level and individually at national level to fight against poverty. Though, recent studies are critical about the effectiveness of these initiatives. One of the reasons of ineffective policies and methods is that states, NGOs, charities and corporations try to find solutions for poverty alleviation within the borders of conventional financial and economic system. Social business is an alternative and innovative concept for poverty reduction. The founder of this concept-Muhammad Yunus- argues a world without poverty is possible. This study explores the social business concept contextually and tries to understand its applicability to end poverty.

**OP-408**

**R&D Tax Incentives**

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One of the most important dynamics of both national and international competition are research and development (R & D) activities. R & D activities, mostly the long-term studies from year to year which is bring up financing problems. Therefore, R & D expenditures supported by direct and indirect incentives in many countries. While direct incentives for R&D include direct grants, indirect incentives for R & D signify tax incentives. R & D tax incentives depends on the financial structure of the country, specifically support the requested areas on a sectoral basis with the existing law in which, the size of the companies, which was established in which year or to be established in which year and which type of tax incentives such as tax deferral, tax credits, tax deductions and tax breaks are preferred. R & D incentive system in Turkey consists of a mixed incentive structure that contains the tax deductions, direct incentives and tax incentives. R & D tax credit applied in many developed countries, but it is not using in our country. Hence, in this study intended to examine R & D tax incentives particularly R& D tax credit system is applicable or not in Turkey which is successfully applied in some selected countries.

**OP-409**

**Convective and Microwave Drying Characteristics of Sorbus Fruits (*Sorbus domestica* L.) \***

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In this research, convective and microwave drying characteristics, energy requirement and color changes of sorbus fruits (*Sorbus domestica* L.) were reported. Sorbus fruits were dehydrated in a computer connected parallel air flow type dryer and in a microwave oven dryer. Samples of freshly harvested sorbus fruits were dehydrated under two air temperatures of 50° and 70°C and at three microwave power levels of PL-1, PL-2 and PL-3. Selected drying air velocity was 0.30 m/s for both temperatures. Sorbus fruits were dehydrated from the initial moisture content of 300 (percentage dry basis) to a final moisture content of 8...10%. During convective drying experiments, product were weighted automatically by the balance per 5...10 minutes. Data were transferred to the computer and processed by a software. During microwave drying, the product were weighted and data recorded manually per 15...60 minutes. The influence of drying method, drying air temperature and microwave power level have also been studied. Hunter L, a, b values system was also used to evaluate changes in total color difference ( $\Delta E$ ) on dried products. The results showed that convective drying air temperature and microwave oven power levels influenced the total drying time, total energy requirement, specific energy requirement and color difference for sorbus fruits. The minimum specific energy requirement were determined as 0.69 kWh/kg and 37.07 kWh/kg for 70°C and PL-3 respectively. 50° C drying air temperature and PL-1 was found to yield better quality product in terms of color retention of Hunter L, a, b and  $\Delta E$ . As a result, to reduce drying energy consumption and to keep better color retention, convective drying can be recommended for this application.

**OP-410**

**Effect of Interaction Time on Immobilization Process of *Bambusa heterostachya* as *Lactobacillus* Matrix \***

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The enhancement in immobilization process using microbial with organic matrix in biological process was an extensive research. The novel organic matrix was found to be used in immobilized process. The application of bamboo as microbial matrix in immobilization process was presented. The physical characteristic of bamboo was studied. The nature physical characteristic such as high porosity promotes bamboo as an alternative microbial matrix. The use of *Bambusa heterostachya* or locally called as 'buluh galah' as organic matrix is a dynamic microbial environment. The existent of microbial cells inside bamboo by immobilization process are optimally structured the use of matrix. The microorganism, *Lactobacillus delbrueckii* was selected as microbial used in immobilized of *bambusa* matrix. The effect study was interaction time with constant pH of 7 and temperature, 37°C. It was performed to determine the bacterial attach in *bambusa* matrix during immobilized process for every 4 hours using scanning electron microscopy (SEM). The results show that the interaction time of immobilized process on *Bambusa heterostachya* as *Lactobacillus* matrix was interactive at 24 hours of inoculation process. Before the immobilization process, scanning electron microscope (SEM) showed that the pore tissue inside bamboo was empty with bacterial. However, after 24 hours of inoculation process, analysis showed that the pore size of bamboo was full with *Lactobacillus*. Therefore, this study proved that bamboo is a good matrix for microbial growth. The immobilized process using *Bambusa heterostachya* as *Lactobacillus* matrix can be further used in industrial application especially in the field of wastewater treatment.

OP-411

**Effect of Radiation Heat on the Chemical and Physical Properties of Bread Enhanced with *Garcinia mangostana* Pericarp Powder \***

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The purpose of this study is to find out the effect of radiation heat on the physical and chemical characteristics of bread enhanced with *Garcinia mangostana* pericarp powder during baking process. *Garcinia mangostana* or commonly known as purple mangosteen, often referred as “Queen of Fruits” due to its health benefit and excellent flavour. *Garcinia mangostana* pericarp has the highest part of the whole fruit. Science proves that the *Garcinia mangostana* pericarp has remarkable benefits as an antioxidant and functional food. Therefore, this research incorporates 0.5, 1.0, 1.5 and 2.0% of *Garcinia mangostana* pericarp powder into bread dough formulation. The combinations of different concentration of pericarp powder has resulted the significance effect on phenolic content, antioxidant activity, colour and moisture content of the bread. Radiation heat transfer model in baking oven was developed in order to analyse the radiation effect during baking process. From the result obtained, thermal processing especially on radiation heat does not give negative effect to the nutritional value even increase or maintain the antioxidant levels in bread after baking.

OP-412

**Effect of Slurry Concentration and Inlet Temperature Towards Glass Temperature of Spray Dried Pineapple Powder \***

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Spray drying of fruit juices represents another alternative way to improve the physicochemical stability and increase their shelf life. Samples of pineapple powder was produced using the spray drying method to investigate the effect of inlet temperature and slurry concentrations towards the glass transition temperature of the pineapple powder. The spray dryer model used was a laboratory scale dryer and samples were run at different inlet temperatures of 130°C, 140°C, and 150°C. Maltodextrin was used as a carrier agent at different concentrations of 15%, 20%, and 25% (wt/wt). The resulting powders were then analysed for glass transition temperature, moisture content, pigmentation, pH value, and particle morphology. Results showed that at higher inlet temperatures and increment of maltodextrin content, the moisture content of pineapple powder decreased. The glass transition temperature of the powders increased as the inlet drying temperature increased. A similar trend in the glass transition temperature was also observed with the addition of maltodextrin concentration. The pH value of the pineapple fruit juice increased with addition of maltodextrin, the same trend was also observed in the reconstituted pineapple juice. The particle size of the pineapple powders decreased with increasing maltodextrin content and at higher inlet temperatures. The highest yield of powder was produced at spray drying conditions of 130°C with a maltodextrin content of 25%. The pineapple juice with high ratio of water obtained low glass temperature. Furthermore, the result also shows that the higher amount of pineapple juice and maltodextrin increase had produced more pineapple powder. From the studies it is shows that the best processing condition to obtain a free flowing and least hygroscopic pineapple powder is the sample of 900g of pineapple juice used with 200g of water with the present of 25% maltodextrin.

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OP-413

**Alterations in Value of Vitamin C and Chemical Composition of Frozen, Dried and Fresh Some Citrus Peels and Their Antioxidant Capacity**

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We investigated fresh, dried and frozen of some highly economic citrus peels mandarin (*Citrus reticulata*), orange (*Citrus sinensis*), lemon (*Citrus limon*) and grapefruit (*Citrus paradisi*) for vitamin C, chemical compositions and antioxidant capacity. The vitamin C compositions of citrus peels were quantified by the high performance liquid chromatography equipped with an ultraviolet detector (HPLC–UV). The antioxidant activity studies were carried out by 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging, reducing power, metal chelating and total antioxidant activity by thiocyanate methods. Fresh, frozen and dried citrus peels showed good antioxidant activity in all the biological antioxidant activity experiments. The total phenolic content, measured using a Folin–Ciocalteu assay, ranged from 67.36±3.09 to 227.21±1.78 mg of gallic acid equivalents (GAE)/100 g dry extract. Interestingly, among citrus samples, dried lemon and grapefruit had the highest total phenolic contents of 168.34±4.03 and 227.21±1.78 mg (GAE)/100 g dry extract, respectively.

OP-414

**Physicochemical Properties of Vegetable Oil-Based Polyols Rejuvenated Asphalt Binders**

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Up to date, no extravagant attempts have been made to use the vegetable oil-based polyols as rejuvenator agents for aged asphalts. In this context, the nature and composition of these biodegradable products need to be identified and chemical properties of different nature of compounds need to be measured. Three different vegetable oil-based polyols designed as castor oil polyol, soybean flexible polyol, and soybean rigid polyol were characterized by FT-IR, TLC-FID, 1H-NMR, and 13C-NMR and by the determination of some usual characteristics such as acid value, hydroxyl value, iodine value, and viscosity. It is speculated that the soybean flexible polyol may serve as a good rejuvenator for aged asphalt.

OP-415

**Evaluating Students’ Need in Using Computer Aided Software in Landscape Design Course \***

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Landscape design is one of a course offered in Landscape Programme in higher level education institutions in Malaysia. The objective of this paper is to study and to evaluate students’ need in using computer aided software in landscape design course in Community College in Malaysia. As a well-known fact, landscape design is a course about drawings and most of the teaching techniques involve hand drawing. Hand drawing class seems to be a problem when it comes to the advanced use of technologies nowadays. The emergence of computer aided software in landscape design course appears to provide convenience to students in this course. Furthermore, there are long-term impacts regarding the literacy of using the software after the students finished their college. The survey involves interviews and questionnaires. Questions for interviews were closed questions whereas a set of questionnaire was distributed to 50 respondents involving three (3) Community College in Malaysia which offered Landscape Programme. Findings of the study showed that most of the students think that using computer aided software is convenience and they are significantly need to use the software in landscape design course.

OP-416

**Improving a Communication Skill through the Learning Approach Towards the Environment of Engineering Classroom \***

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The dominant pedagogy for engineering education, especially for numerical subject still remains “chalk and talk”. Recent years in engineering education have encouraged teachers to engage their students in various forms of communication. One of the most common ways teachers observes the student achievement in the classroom is talking to them. This assessment is on student reflection, it can become clear that certain forms of personal communication definitely do represent assessments of student achievement. Therefore, this paper presents a learning approach towards the environment of the engineering classroom in improving a communication skill. The quasi experimental study was conducted involving the engineering students, which comprised one experimental group and one control group. The learning process covered a period of 8 weeks for teaching and learning in phase 1 and phase 2. In the learning process, students learn how to analyse the unstructured problem given among the small group members and develop an idea into the discussion. Through this approach, students acquire communication skills in generating the ideas. The role of learning approach used to enhance the capability of communication skills among students. This study was used to measure the influence of the communication skills towards the students' academic achievement and to measure the percentage of the students' acceptance of this learning approach. The results of this study show that the effects of this learning approach upon the capability of students communication skills and student learning approach were significant. Finally, the results consider the relationship between the applied learning approach and the ability to communicate among students reflectively. It shows how teachers' knowledge, learning approach and communication could give an impact in creating an interactive classroom.

OP-417

**Creativity and Innovation among Gifted Saudi Students - An Empirical Study \***

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Nations prosperity in a dynamic global economy depends critically on the quality and quantity of knowledge, innovation and creativity skills generated and gained by their human assets. Creativity, innovation and quality systems are at the heart of successful strategies adopted by modern economies. In general terms they are meant for the creation and adoption of new knowledge to improve the value of products, processes, and services delivered to customers. They have been recognized as a source of competitive advantage by policy makers as well as industry practitioners around the world.

The present study was carried out within a national research project funded by the ministry of education in Saudi Arabia, with the primary aim to enhance and to develop creativity and innovation among Saudi students at both school and university levels. The paper discusses the relationship between creativity and innovation, and the educational system and social environment. A survey questionnaire was developed for the purpose. Respondents were selected among the gifted students participating in the national competition on giftedness 2015 run by the ministry of education in the Hail region, north the kingdom. The survey was administered online using web 2.0 technologies. They were asked about their personal perceptions of the importance of creativity and innovation in their educational environments and programs, the support and management of creativity and innovation within the educational system, and the future prospects the university would offer to them. Statistical analysis of the results will be presented and discussed. The study identifies practical recommendations towards the adoption of new strategies to enhance creativity and innovation among Saudi students.

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OP-418

**Sustainable Quality Management in Libyan Higher Education: A Study in Process Innovation**

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An increasing interest in the implementation of quality management programs in higher education has been observed over the past decade, particularly among developing nations. Previous studies have shown that universities find it difficult to sustain quality programs but global initiatives by UNESCO and UNDP have encouraged the adoption of sustainability in every facet of university systems including education quality.

An extensive review of sustainability and quality related literature suggests that a SQM model can be developed for higher education through the integration of sustainability and quality models. This implies that apart from economic considerations, environmental and social dimensions should also be included in quality management models. In order to move towards this goal, the paper explores links between Sustainability principles (a combination of the Triple Bottom line and Forum for the Future's Five Capital models) and two quality management approaches – (Deming's Plan Do Study Act (PDSA) and the European Foundation for Quality Management (EFQM)). The paper builds on these literatures through the presentation of data derived from a study of over six hundred respondents engaged with Higher Education in Libya, and aims to report on the synthesis of this literature and data and to present the resulting sustainable quality management (SQM) framework, consisting of eight core Critical Success Factors.

OP-419

**MOOCs in Malaysian Higher Education: Stakeholder Analysis via Triple Task Theory**

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The emergence of Massive Open Online Courseware (MOOC) has ubiquitously gained traction as one of the primary drivers in lifelong learning innovation for higher education. Albeit the exponential growth of MOOCs, there is a lack of study on business model that streamline the roles and needs of the multi-stakeholders in ensuring the core competency of MOOCs deliverance and success rate. Within the parameter of Malaysian higher educational institutions, the stakeholders comprise of MOOC manager, MOOC committee, academic staff, technical support, students and other potential end users. Hence, this paper discusses myriads perspectives on MOOCs in higher education landscape that later leads to stakeholder analysis, framed by Triple Task Methodology. The Triple Task is used to align the multilateral strategic interactions between all the stakeholders and synthesize the dynamics of multilateral participation and distinctive cross value chain in designing the ideal MOOCs for Malaysian higher education. The paradigms are instigated through three phases; Soft Systems, Socio Analysis and Symlog where the unit of analyses are stakeholders affiliated with Universiti Teknologi Malaysia. The findings will propagate future studies on development of MOOCs business model that cater to the needs of the stakeholders in the Malaysian higher educational institutions.

OP-420

**A Maritime Research Concept Through Establishing Ship Fleet Operational Problem Solution Centre Via Information Technologies Integrated with OR/MS \***

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The recent developments in maritime transportation have been leading to integrate advance management systems into ship fleet operations. Design and implementations of such systems are highly required managerial skills and methodological tools. This study conceptualizes a ship fleet operational problem solution centre to systematically analyse the various cases, facts and figures promoting with comprehensive outcomes. Besides the feedbacks from ship operating environment, the solution centre also considers the technology expectations specified in the recent global initiatives (i.e. Horizon'2020, IMO strategies) to predict the required future maritime innovations. As another aspect, the methodological background of solution centre takes the advantage of OR/MS techniques comply with the focused problems. Consequently, this paper presents the critical milestones of providing information technology solutions to ship fleet management such as data acquisition, modelling, shipboard integration, verification, etc. in a continuous maritime research concept.

OP-421

**Ground Granulated Blast Furnace Slag (GGBS) Based Concrete Exposed to Artificial Marine Environment and Sustainable Retrofitting Using Glass Fiber Reinforced Polymer (GFRP) Sheets \***

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Ground Granulated Blast Furnace Slag has been constantly in use as cementitious replacement for sustainable infrastructure. But little is known about interaction of GGBS based concrete with marine environment. These days due to the rapid development in offshore engineering marine environment and its simulation has come under limelight. Temperature fluctuation has also become a subject of interest for concrete structures. In our study we have casted sixteen numbers (16) of cylinders of M25 grade(BIS code specification) out of which 8 were incorporated with GGBS. Four cylinders of normal concrete and four cylinders of GGBS based concrete were exposed to artificially created marine environment in a temperature controlled curing tank. 3% NaCl+CaCl<sub>2</sub> by weight solution is prepared for substitution of marine water. The ambient temperature in the curing tank is fluctuated between 25°C to 50°C for 60days to study the changes in GGBS based concrete strength in elevated temperatures. Nowadays Glass Fibre Reinforced Polymer has become a favorite choice for sustainable retrofit for concrete structures. An attempt has been made to retrofit the concrete exposed to marine environment. The results shows a substantial increase in strength after retrofitting.

OP-422

**Developing Innovative Applications of Technical Drawing Course at the Maritime Training \***

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All the information required for the production of a detailed picture to be transferred as part of the engineering is called technical drawing. Technical drawing can be drawn within the framework of its own rules has a readable feature. Drawings can be drawn by hand, drawing equipment (pens, compasses, rulers) or the computer with the aid-funded programs. The result of industrialization in the 19th century has increased the importance of the technical drawing. Complex projects with a combination of each piece was made clear by using drawing installation images. Today, the technical picture has become an indispensable communication tool for engineering. Failed, broken or technical drawings for the explanation and description of the parts to be manufactured has become a new form of language depends on the basic standards anywhere in the world. Developments were reflected in the maritime sector. Drawing applications used in the manufacture of ships, also gained importance in the balance and construction account. Covering recent years has been facilitated by computer-aided ship design software projects that replace paper disk less space, has virtual drawings stored in CDs or external hard drives. In this study, Marine engineering drawings and computer-aided design of the importance of maritime education, are being investigated as active as long as how to switch from the traditional process of innovation. Advantages and disadvantages of innovative and traditional understanding of technical drawings were compared. Drawing education in Turkey and the world are examined in terms of marine engineering. The promotion of maritime drawing education as a result, the incomplete elimination, supported with computer software, which provides great opportunities for the supply part during fault in the ship along with improving the education provided in schools, therefore, has been found to reduce costs.

OP-423

**Six Sigma Implementations in Supply Chain \***

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The six sigma methodology have an important place for developing and reducing the actions which do not have inner process in supply chain in the firms. The aim of six sigma is defining, analyzing, correcting and improving the variables, which affect the quality of supply chain process in order to decrease the number of defects and the failures and to propose the improvement means for the processes. In this study general structure of six sigma is explained with regard to 'how to define the complex problems which are encountered in the supply chain' along with the relevant knowledge and comments for statistical methods that are utilized in measurement and analysis of supply chain.

OP-424

**A Scenario-Based Usability Test Approach for Improving Depersonalized Online Job Application Procedure \***

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Interdisciplinary collaboration of engineers and social researchers in design process is an increasingly recognized issue. The present study offers an exemplary approach for such collaboration during the usability studies of a software conceptualization. The aim of the project is to develop the concept of an innovative online platform that meets the requirements of private and public employers and fosters equal opportunities at the first stage of the recruiting process. The concept of the platform includes: a web-based ("Software as a Service") solution to organize and manage the entire first stage of the application and recruiting process; an "application management tool" for job seekers; and a recruiting software for employers. In this project

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we develop a skill based matching approach for depersonalized applications. In order to improve the quality of the platform, a prototype is prepared and usability studies are accomplished for different stakeholders. Usability is defined as a quality attribute that assesses how easy user interfaces of a system is. There are five aspects of usability namely, learnability, efficiency, memorability, errors, and satisfaction. Usability tests are applied to individuals from different stakeholders, such as employers, employees and policy makers. In this study we present the results of the usability tests that can be used for improving better platforms.

**OP-425**

**Energy, Innovations and Economic Development**

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In this article we are going to study the Energy Crisis in Pakistan and its impacts on the economic development, more importantly the role of energy and innovations in economic development. Where the business and the financial economists pay major attention to the impact of oil and other energy prices on economic activity, the majority theory of economic Development pays little or no attention to the role of energy or other natural resources in promoting or enabling economic development. Resource and ecological economists have criticized this theory on a number of grounds, especially the implications of thermodynamics for economic production and the long-term prospects of the economy. While a fully worked out alternative model of the development process does not seem to exist, extensive empirical work has examined the role of energy in the development process. The principal finding is that energy used per unit of economic output has declined, but that this is to a large extent due to a shift in energy use from direct use of fossil fuels such as coal to the use of higher quality fuels, and specially electricity. When this shift in the composition of final energy use is taken into account energy use and the level of economic activity are found to be tightly coupled. When these and other trends are taken into account the prospects for further large reductions in the energy intensity of economic activity seem limited. The implications for environmental quality and economic sustainability are discussed.

**OP-426**

**What it Means to be a New Classical Economist ✱**

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The New Classical School works with rational expectations and full flexibility of prices and wages in all markets. The concept of rational expectations was first introduced by J.F. Muth (1961). Robert E.R. Lucas Jr. (1972) developed and popularized this hypothesis. Thomas Sargent, Neil Wallace, Robert Barro are other distinguished representatives of this school.

What is important in the New Classical School is first of all the assumption of full flexibility of prices and wages. As a result of this assumption, all markets will reach equilibrium, economy will automatically settle at the point of full-employment. Unemployment will be voluntary which will be denoted as “natural rate of unemployment”.

According to Rational expectations hypothesis, on the other hand, all the economic agents have full knowledge and information about economic decisions – including government policies and their effects – and take into account their future expectations in a right way. In this case, the government policies which will be expected and known to everybody will be already taken into account and the decisions on prices and quantities are formed accordingly, thus prices are formed in a complex fashion. In this manner, efficiency of government policies neutralized. Hence, as much as Keynesian financial policies, monetarist monetary policies are ineffective as well. The only effective impact in economy seems to be “unexpected shocks” and accordingly “unexpected” or “shock”. New-Classical School have had weight after ‘70s due to inflationary effects of the Vietnam War and the stagflation following 1973-1974 oil shock.

**OP-427**

**Bayesian Expectations and Strategic Complementarity: Implications for Macroeconomic Stability ✱**

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This paper examines the heterogeneous market in which economic agents of different information-processing abilities interact. In the theoretical framework, the market is composed of three different types of agents, “sophisticated” agents with rational expectations, “naive” agents with adaptive expectations, and Bayesian agents endowed with learning abilities. The behavior of these agents in the context of an important economic problem of nominal price adjustment after a fully anticipated one-time negative monetary shock is examined. If sophisticated agents with their perfect foresight find it profitable to imitate the biased behavior of naive agents, then the interaction of agents exhibits strategic complementarity. Thus the naive agents will have a disproportionately large effect on sluggish price adjustment towards equilibrium. However, the introduction of Bayesian agents with learning abilities into the market will have a compensatory effect by mitigating the price rigidity. Since Bayesian learning is allowed in heterogeneous market, Bayesian agents that first start as naive will undergo a learning process to become sophisticated after a certain period. In conclusion, the proportion of naive agents decreases in favor of sophisticated agents as depicted in the simulation model. As a result, the price adaptation towards equilibrium is accelerated.

**OP-428**

**Determination of the Regional Impact on Innovation with an Ordinal Logit and a Multilevel Analysis ✱**

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Although innovation is considered as an engine for the economic growth of the firm, it remains a risky and complex process. However, in the current context of international competition, firms can't survive without innovating. The identification of the main determinants of an innovation effort by a firm is a subject that has been much discussed in recent studies. This research aims to identify the main determinants of the innovation decision of Tunisian companies. It evaluates the contribution of R&D efforts and other factors summarized in the company's ability to cooperate on the result of product, process, organizational and marketing innovation. As well, we will check up whether the 24 governorates of Tunisia contribute equally to innovation within companies. To do this, we use data on a sample of 620 firms observed by the Ministry of Scientific Research and Development Competency in Tunisia in 2008 spread over 24 governorates. Methodologically, we propose in the first place a logistic regression in which the endogenous variable expresses the output of the firm number's of innovation (one type, two types, three types or four types of innovation). The exogenous variables selected are the activities of R&D of the company, cooperation with research centers, foreign companies and universities, the qualifications of the employee, the foreign capital share, the turnover, etc... The results of estimating a multi-level model show that innovation differs from one governorate to another. The results of the estimation of an ordinal logit and a multi-level model show that expending on research and development is a key determinant of innovation (odds ratio equal to 5.3) and that it differs from one governorate to another (the variance of weights assigned to Level 2 (governorates) equal to 27.7%).

OP-429

**The Analysis for the Validity of Compensation and Efficiency Hypotheses in Turkey Between 1975-2013 \***

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The relation between trade openness and government size is examined under the compensation hypothesis and efficiency hypothesis in the literature. Therefore, in this paper, the Compensation and Efficiency hypotheses are tested for Turkey between 1975-2013. The existence of unit root is tested, then cointegration and Granger causality tests are implemented. No causality is diagnosed empirically between government size and trade openness. In result, both hypotheses are not valid for Turkey.

OP-430

**In Innovative Entertainment Economy Framework, Economic Impacts of Culture Industries: Turkey and Hollywood Samples \***

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This study begin with the facilities of the film industry in Turkey, then activities of Ministry of Culture and Tourism General Directorate of Cinema of Turkey, sales of box office, and film industry investments are discussed. Contributions of the film industry to economies and cultures of the cities analyzed with multiplier effect. When analyze the Turkish film industry exports, which has been argued that it is level to show the effect on the international scale. The main point of this discussion is Hollywood film industry that has effects in global scale with advances level. The film industry is seen as a mass communication tool with sub-factors. Cinema is also one of the content items of mass media. It affects society in many different ways as from fashion to tourism and from culture to economy. Hollywood is a successful sample in this regard. It has effects all around the world with perception management and commercial relations. In what degree, Turkey can export series, movies and other multimedia elements and use movie industry as an economic and cultural bridge were evaluated. Although early stage, the transfer of cultural codes and economical choice will be realized more quickly with the improvements of communication and transportation facilities. The issues to be addressed within the scope of cultural economics and information technology, the effects of the Turkish film industry on a global scale will be considered, so that the researchers who will make new studies, the investors who make movies, and industrial organizations have a study to base. By examination of this study periodically in the future, changings of effects of the Turkish film industry on a global scale to be seen and trend analysis can also be performed.

OP-431

**Adam Smith: The Inspirer of Modern Growth Theories \***

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In economics, one of the most important subjects is to increase economic growth and welfare of society. As one of the most important political economists, Adam Smith analysed the dynamics of wealth of nations and welfare of individuals and societies. In this study, we mainly focused Smith's views on the determinants of economic growth. It is clear that modern economic growth theory has been still benefited from the Smith's views on the economic growth which are division of labour, education, human capital, learning by doing, increasing returns to scale, technological change, externalities, institutional factors such as global free-competitive market economy, the role of government etc. Even if we are not on the same wave with Smith, it is still very important to review Smith's views on the determinants of economic growth in order to design better economic and political environment for economic agents to increase wealth of nations.

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OP-432

**The Validity of Wagner Law on Turkish Economy: An Ampirical Analysis \***

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The relationship between public expenditures and GDP is an important issue. The direction of causation of this relationship affects macroeconomic variables. According to Wagner Law an increase on GDP increases the public expenditures. Unlike the Wagner Law, Keynes argues that an increase on public expenditures provides growth of GDP. In this study, the direction of relationship between public expenditures and growth of GDP for Turkish economy has been examined. To reach an ampirical conclusion, the validity of Wagner Law for Turkey was tested by using econometric models.

OP-433

**An Empirical Analysis About Technological Development and Innovation Indicators \***

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Researches on technological development and innovation indicators that are used as different criteria for measurement such as multivariate statistics methods have increased rapidly in the field of social sciences since 1990s. The concept of indicators is an interesting field of science, which are used to inform us about things that are difficult to measure. Indicators for technology development and innovation may be defined as statistics, which measure quantifiable aspects of technological development and innovation creation. In this research, indicators help us to describe technological development and innovation clearly and enable us to have a better understanding of the impact of policies and programs on technological development and innovation and on the society and the economy in general. The objective of the present paper is to examine whether technological development indicators, which are used as a proxy for economic growth, innovation and the development level of countries, are influenced by the used variables in this analysis. The study is conducted by using a very large data set. It covers the time period of 1996 and 2011. The study includes a variety of variables such as research and development expenditure (RDE), high-technology exports (HTE), long-term unemployment (LTU), patent applications-residents (PA), patent applications-nonresidents (PAF), health expenditure (HE), GNI per capita (PPP), share of women employed in the non-agricultural sector (SWE), stocks traded (ST), internet users (IU), scientific and technical journal articles (STJ). The empirical results which were obtained by using MDS (Multidimensional Scaling) and HCA (Hierarchical Cluster analysis) methods suggest that the variables of RDE, PA, HE, PPP, SWE, IU and STJ have significant impacts on technological development and innovation and should be reviewed all together.

OP-434

**The Role of an Intermediary Agent in Technology Integration Within Developing Countries: A Film Industry Perspective \***

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The Bangladesh Film Industry has been attempting to move from traditional analogue film production to digital production during the last decade without much success. One major problem is that the digital technology has to be acquired from international donors in advanced countries and the Government's public procurement policy stipulates that this transfer of technology from the donor to the recipient must be expedited by a local 'intermediary agent' (e.g. business entrepreneurs). Our research findings have confirmed that the local film industry (recipient) requires support with installation of technology, film distribution/exhibition, and maintenance (production level) and some management

tasks. All of which is not usually provided because of incompetency on the part of the intermediary agents and because of limitations in the public procurement policy for this industry sector. One policy implication is whether government procurement policy should target more direct B2B contact between the technology recipient and the international donor. This could help upgrade innovation capabilities of local industry. Our empirical research findings are based on direct insights gained from six semi-structured face-to-face interviews with key respondents based in Bangladesh (e.g. Directors and Senior Management staff of the Bangladesh Film & Development Corporation and other key respondents). Note: findings reported here are from a larger study of 40+ interviews on the theme of digital technology integration in Bangladesh film industry. We report that policy makers should direct policy toward the development of technological system, infrastructure and technical training in the long run, rather than mainly focusing on boosting foreign technical assistance, which does not appear to help support manufacturing processes in film making to make a smooth transition from analogue to digital technology use. There should also be a sterner public evaluation body that pre-evaluates and post-evaluates the success or otherwise of the technology integration process.

**OP-435**

**The Impacts of Robotics, Artificial Intelligence on Business and Economics \***

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In the Industrial Age that humanity has entered long time ago with steam series has caused to primitive mechanization in production. With the development of internet and mobile technologies, electronics, nano technology, advances in medicine, health and digital applications and so on speed up mechatronics studies nowadays. Last World Economic Forum holds an important place on the agenda of Robotics and Artificial Intelligence and the economists like Roubini, Stiglitz also entered in the discussion of robotics and artificial intelligence impacts on economics and business. Although Stephen Hawking critics on the risks in this regard, everyday we are witnessing a tremendous news and articles in business pages, regarding on that topic and obviously corporate life and professionals can no longer resist to these changes. Changing form of the business terms and work forces, the way of doing business by using new technologies will have serious impacts on the daily business life and deriving from that on countries and on world economics. Many items and headlines such as jobless ratio, Philips Curve, recruitment, management, CRM Analytics, customer relationship management, sales, strategic planning, mass production, Purchasing Power Parity, GDP, inflation, money, Central Banks, Banking System, coaching, training, accounting, taxes etc. will face serious dangers, hits, change, exposures with the improvements in Artificial Intelligence and Robotics. One simple example can explain the degree of these impacts: Should we continue to make provisions for severance pay of the company's staff or should we calculate reserve for depreciation / amortization for robots in the company, which side of the balance sheet will be managed by human resources managers or shall we still name human resources ? This paper is aiming to adress and discuss the future of robots, mecatronics and artificial intelligence in different perspectives mainly in an innovative and futuristic way of thinking.

**OP-436**

**Technological Development and Economic Development \***

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In a globalizing world economy, the reason for differences in economic growth and inter-country income inequality is explained on the grounds of technological differences. Developed countries, which are well aware of the value of technology, are enjoying the benefits of welfare and progress driven by technology. While people living in industrialized countries account for merely 20% of the world population, they consume 80% of natural resources. The scarcity of resources brings with it such problems as shortage of food, beverage, accommodation, health care and education... Any country failing to solve these problems would have to face a deteriorating level of poverty.

\* Indexed by Elsevier

During times of growth, production factors available to poor people are used much, and this contributes to a lesser poverty and an a better income distribution. In today's world, technology plays a crucial role in rendering scarce resources more efficient. An enhanced efficiency of resources paves the way for both cultural and economic growth. Economic growth is a must for economic development, such that economic development stops in the absence of growth. The quality of growth rates is as much important as their size. One may ask the following questions in order to get a better understanding of whether growth has its reflections on people's life or not: Are people involved and included in growth process? Does everybody enjoy the opportunities driven by growth? Do new technologies or trade volumes increase the choices facing people? Is welfare level of the future generations planned? Or, else, who is cared about is today's generations only? Are markets accessible and open to everybody?

**OP-437**

**Comparison of the Public Aids Between 1986 and 2014 \***

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All over the world as a result of financial crisis that occurred in the last quarter of the 20th century, passed again liberal economy policies. So, welfare policies were restrained by governments. These type of policies brought discussions on social exclusion of poverty. Especially, politics of Thatcherism and Reaganomics instead of cash transfers and service providing, supported private communities and foundations to help poor. In Turkey, on 24 January 1980 with announcement of neo-liberal politics, in spite of the expectations the governments continued to protect poor people. Particularly, in 1984 with the establishment of the "Social Aid and Solidarity Promotion Fund" with Code numbered 3294, government and local authorities had an important role to protect poor people and struggle with poverty. Nowadays in Turkey, help transfers are made by Directorate General For Social Aids that belongs to Families and Social Policies Minister and they show differences from year by year. Today's help transfer are very different from the old one's that provided in the late 80's. Government make social cash transfers for poor people, to support education of their children, family, disabled people, widow woman and military families, to use health services, to have accomodation, to serve free meal and to help in the case of natural disasters. In addition to these, municipalities make cash transfers, provide home care services, give family aids to woman, and give educations on special areas etc. from their budget. In Turkey, despite of neo-liberal politics, providing these helps are explained by many scholars with the historical perspectives, however others argue that these helps are being made for the clientelism. In this study it is aimed to explain the differences of benefits in terms of quality and quantity that are provided by Social Assistance and Solidarity Encouragement Fund from 1986 to 2014.

**OP-438**

**Clustering and Innovation Concepts and Innovative Clusters: An Application on Technoparks in Turkey \***

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The aim of this paper, clustering, which is an important model in the development of the countries and the concept of innovation have been reviewed together. The most prominent feature of the industry is to produce Technology. Countries to focus on knowledge-intensive industries and businesses as a result of regional cluster policies for innovation is seen that there is a relation between. The samples obtained over the world and have tried to propose solutions for Turkey. Clustering is an important model for an innovational development In Turkey.

OP-439

**Innovation and Competitiveness \***

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After World War 2, borders were removed between countries, with The General Agreement on Tariffs and Trade (GATT). Efforts to liberalize world trade began with regional integration and with the acceleration of globalization since the early 1980s. As a result of the developments in information and communications technologies and the increase of capital movements, the economic structures, judicial systems and lifestyles of the countries have increasingly begun to resemble one another. The disappearance of protectionist tendencies on world trade caused an increase in exports while the assimilation of consumption patterns caused by globalization, increased world trade. Because many countries produced similar products and exported them, international competition inevitably increased. In an intensely competitive environment, the innovation process, defined as the invention of new products in order to produce highly competitive products or the improvement of existing products, was necessary to implement. In this context, R & D activities and the innovation factor represented by patents have become an important competitiveness factor. Therefore, this study will primarily focus on demonstrating the relationship of innovation-competitiveness and discuss the current situation in Turkey.

OP-440

**Positive Influences of Green Innovation on Company Performance \***

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This study aims to examine the effects of green innovation on company green performance. Here, green innovation includes green product and process sub-dimensions and environmentally efficient company performance has also two sub-dimensions as environmental performance and competitive advantage of company through its green facilities. In order to find out relationship between green innovation and company green performance a survey performed among companies which presents first 500 companies with their turnover according to Istanbul Chamber of Industry's records. With gathered data from survey study, correlation and regression analyses conducted. Moreover, to detect if there is any difference according to company characteristics, some further analyses performed. Results of this study states that, green innovation activities have significant effect on a company's environmental performance and competitive advantage. Especially, green process innovation highly explains changes on environmental performance and competitive advantage. Any environmental difference of company's basic processes not only reduces company's environmental affects but also moves the company to a better position among its competitors.

OP-441

**State of the Art for Sustainable Development: The Empirical Evidence From Dynamic Capabilities Theory of Technical Eco Innovation Efforts \***

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The increasing worldwide awareness towards sustainable development has impetus on generation of green efforts from all walks of life. Even though manufacturing industry recognized as the heart of nation development, but it's imposed to the causes of a natural disaster. Thus in the new millennium, eco innovation became a buzz word as to leverage the green efforts. Mostly, firm's eco innovation efforts rely on complying customer regulation and government policy rather than firms own initiatives. Hence, dynamic capabilities considered as a cutting edge to portray micro efforts. In a nutshell, technology collaboration, green human resource (GHRM), eco culture, formal EMS and top management support as a proxy for this construct. Sample data

\* Indexed by Elsevier

was collected from 320 respondents comprised of Small, Medium (SME) and Large Corporation and derived from automotive industry in Malaysia due to progressive commitment towards green initiatives. The proposed model and related hypotheses were tested by using the Structural Equation Modelling (SEM) techniques. The findings provided the general principles and acquired understanding in firms own initiatives to achieved sustainable development as well as eco innovation. Sustainable development can be achieved via adopting firm's dynamic capabilities embedded in five main forms as per range; top management support, Green Human Resource (GHRM), technology collaboration, formal EMS and eco culture. Further, technical eco innovation was crucial to mediate the relationship between Green human resource (GHRM), technology collaboration and formal EMS to realised sustainable development. Apparently, this study shed light on crucial factors need to be emphasized as well as provide insight towards modelling triple bottom line effect of economy, ecology and social in a developing country context. Finally, the implications of this study and future research are discussed.

OP-442

**Make up as a Sign of Public Statu \***

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From the birth of a human being, first advised of his family then lived in the society's traditions, religious and political beliefs need to makes changes in the body. Sometimes specific professional groups, the rules can be found in this guidance related to physical appearance. Hair and beard, it is given a specific form of failure or to extend the term of Office, made the body shape to the nails or painting, tattoos are almost as old as human history, based on the method of self-expression. giving shape to the eyebrows of different designs, use a wig, fake nails and physical changes such as wear tinted lenses for centuries have been observed with applications ranging from society to society. Body to show the weaker or different forms of enhanced techniques, "to be healthy" concept for society's good he found and next to the rating's feelings. Within the community, in fact, from time to time and from society to society changing "beautiful" seems ideal for people can be defined as "plastic surgery" permanent makeup to a high price to pay, and even vital to take risks they are willing to do up to radical changes.

Cosmetics Industry to meet the demands of people look beautiful, a work of millions of people in the production and sales area with younger and more serves to realize the ideal of looking nice. Both economically and socially, so do many physical changes of great importance "makeup" applications typically only lipstick and pencil coloring process consisting of all kinds on the body is detected as the view covers the change and didn't like the makeup and even of persons who do not brush their teeth every day, their nails and hair done while the application is makeup. In particular, different religions, different forms given to hair and beard are representing the views of their own religious expression is practiced as a method.

OP-443

**Evaluation of National Science and Technology Policies in Iran \***

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Science and technology is the engine to sustainable development, and is also the major solution to the socio-economic growth and crisis. Looking back at the development (modernization) history, every great revolution was closely linked with transformative breakthroughs in science and technology, which had a far-reaching impact on the rise and fall of a nation and the destiny of a country as well. The countries that were able to seize the opportunity and achieve the socio-economic take-off had taken the lead in fulfilling development. Thus, the national science and technology (higher education, research and technology system) policies in Iran is approved in September 2014. These policies are included 6 main policies and 34 sub policies. In these policies, is defined and presented the position of Iran's higher education, research and technology in dimensions of inputs, processes and outputs, and interactions of Iran's higher education, research and technology system with other political, economical, social, cultural systems and total world. Also, these policies are shown the



position of science and technology in the long term. In this paper, the existent situation of Iran's S&T has investigated based on these policies by analytical method. Based on this evaluation can identified the situation of Iran's S&T towards the future. With full implementation of the S&T policies, is expected that Iran reach to world better level in S&T field and socio-economic growth and development.

### OP-444

#### Improved Business Model Representation of Innovation Concepts

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Except for academics and consultants, the concept and purpose of innovation (not to mention related concepts such as "Open Innovation", "Free-Intellectual Property Innovation," or "Open Source Innovation") is usually unclear for most entrepreneurs and other practitioners. It often times happens that newly coined terminology becomes misleading or may even include a certain degree of sensationalism, hence turning into a matter of debate for specialists in the realm of technology management. Such has been the case for the term "Open Innovation", since the word "open" is mainly related to crowd sourced innovation, but not for the openness on intellectual property rights. Since innovation is about the commercialization of original ideas, so we propose a simple and visual business model setting to resolve these concepts. To this regard, the "Business Model Canvas" has been used in business and entrepreneurship to sketch and frame the key points behind the development of a startup. This model was suggested by Alexander Osterwalder (2008) in his work on Business Model Ontology, as a strategic analysis template for developing startups or documenting existing businesses. It describes the firm's value proposition, partners, resources, activities, customer relationships, distribution channels, customers, revenue streams and cost structure. However, when it comes to innovative startups, this template does not explicitly include such significant innovation components as intellectual property, its alignment to strategies, and intellectual property flow. The present paper proposes the use of an improved version of the Business Model Canvas to originally represent different models of innovation like Open Innovation, thus providing a clear, visual and quick representation of their meaning, and consequently, contribute to a better understanding of different concepts of innovation.

### OP-445

#### European Regional Innovation Strategies (RIS): An Historical Investigation

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The notion of regional innovation strategies (RIS) has been around for approximately two decades, since 1996. During these decades, economic development and technology generation have created new initiatives for the whole spectrum of economic activities. The solution for addressing economic weaknesses has been given with the focus on the development of knowledge and innovation. The paper that follows studies the European Regional Innovation Strategies from an historical perspective. The paper is structured as follows: First part, the introductory part, presents the main framework for the concept of regional innovation strategies and tries to justify the need for their conceptualization and further development. Second part does a bibliography review on the issue of regional development and innovation, highlighting the need to innovate and its incorporation to developmental concerns. Third part describes the main parameters of regional innovation strategies historically, starting from RIS 1 to RIS 3, focusing on their main points of interest and addressing their differences and changes from RIS 1 to 2 and then from RIS 2 to 3, which is known as 'smart specialization'. The main challenge of the third part of the paper is a comparative analysis between the different frameworks of regional innovation strategies. The comparison shows that, although they share similar elements, the evolution of the socioeconomic context and the way of understanding the notion of innovation have made a new approach necessary,

in regard to the objectives and the results, as well as in the form of defining, implementing and monitoring. Thus, RIS3 is a renewed instrument adapted to the new global economic conditions of the 21st century, to help regions set out and reach right choices for their prosperity and development. According to today's needs and requirements of RIS3 can provide a clear and detailed way in order to have the desirable results.

### OP-446

#### Geography and Innovation: An Analysis Based on Patent Records for the Total of European Regions

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Theoretical and empirical research argues that economic activity is concentrated geographically because of scale and proximity effects and that innovation is an important and motivating factor for its clustering. Gradually and over time a pattern of geographical concentration of production and innovative activities will occur. However, empirical research also suggests that there are differences in spatial concentration of both innovative and economic activities, both across regions and industries. Particularly for innovative activities, they tend to be concentrated in few industrial sectors and technological fields. The objective of this paper is to study the relationship between geography and innovation for the total of European countries at regional level, namely 31 countries. The analysis relies on the existing arguments of both agglomeration and disparities of innovation activities throughout time and results are based on patent records, which according to researchers in this field, seem to be a useful indicator in order to measure innovation activity at regional level because they provide accurate information on the for inventors' residents, while indicating phenomena of knowledge diffusion and potential networks. The paper is structured as follows: Section one discusses the theoretical and empirical framework of innovation and regional development in relation to patent records and the construction of relevant indicators for this purpose. Section two describes the data that has been used and the methodology that has been followed in the study. The analysis is based on patent data from the OECD patent database from 1998-2011. Section three presents the empirical results of the study. European regions are classified based on their patent stocks, growth, intensity, concentration and other parameters. Section four focuses on the top 20 most innovative European regions and tries to investigate and explain the reasons for their dynamism and performance through statistical analysis and evidence. Finally, section five concludes.

### OP-447

#### The Contribution of the Greek Academia in Innovation Production: A Patent- Based Perspective

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As society and economy become more 'knowledge-based' there is raising pressure for the translation of academic research in innovative outcomes. Academia is commonly perceived as detached from entrepreneurship and economic development. However, academia plays a key role at the heart of the knowledge-based economy. They educate people with the needed high level skills and they generate as well as apply new knowledge to enhance economic prosperity and quality of life. Relevant indicators show that Europe lags behind the US in terms of academic patenting. Meanwhile, more recent evidence on the parameter of patents has shown that academic patenting is higher than currently perceived and this result is derived through examining different classifications and kinds of empirical analysis. Greece is considered to be lagging well behind its European partners. In this context this paper studies the patents produced by academia focusing on the Greek case. The Greek academia comprises of universities and the technological education institutes (TEI). The patent activity of the Greek research organizations is also included in this study, for they are tightly connected with the Greek academia based on various forms of relationships. The paper starts by analysing the existing literature on this field, discussing the role of and importance of academic patenting and the main

challenge for the future. It then presents the Greek case from 1988 to 2013. First results show that the Greek academia 'officially' produces and owns a low number of patents. Officially means that these patents are assigned in the name of the academic agent itself being. However, the further analysis shows that many academics protect their patents under their names and not under the academic agent's name. Why does this happen? The last part of the paper is devoted into this issue, discussing the potential causes and implications of this reality

**OP-448**

**How Does the Competitive Environment Affect the Rate of Innovation? A Case Study of Turkey**

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This paper examines empirically the determinants of Research&Development (R&D) activities by Turkish firms. In particular, we test the impact of competition environment on the firms' innovation decisions. We use Turkish firm-level data from the Business Environment and Enterprise Performance Survey (BEEPS) for the years 2002 and 2005, and a panel data for 2005&2008.

There is a general agreement in the literature that technological innovations are an important contributor to economic development and growth. This important nature of the relationship between competition and innovation has attracted the attention of many researchers.

However, the large literature on the effects of competition on innovation has failed to reach a consensus. This is because the effects vary with market structure, definition of competition, and the type of innovation.

The ambition of this paper is to analyze the relation between competition intensity and innovation by capturing different aspects of firm competition and rate of firm innovation. Some of the competition measures we use among others are; the number of competitors, the number of firms in a given sector, domestic market share, price-cost margin, firm's level of technology compared to competitor, and the importance of pressure from domestic and foreign competitors. A broader definition of innovation is important for developing countries like Turkey since it is more likely for these countries to imitate or adapt existing innovations. We consider innovation activities such as; R&D expenditures as a percentage of sales, developing a new product line, upgrading an existing product line, introducing new technology, opening a new plant, obtaining a new licensing agreement, outsourcing a major production activity that was previously conducted in-house. Findings on the sign of linear relationship between competition and innovation is mixed. For most specifications we find that competition is conducive to innovation. We also find evidence of an inverted-U relationship.

**OP-449**

**Innovation Development Strategies in Naturalgas Sector**

*Muzaffer Ertürk*

*İgdaş*

The role and importance of the energy sector in Turkish and the world economy is rising by depending on economic growth rate. The natural gas among the energy types has important advantages comparing alternative energy sources in terms of environmental pollution and general usage, in particular. Product innovation, process innovation, marketing innovation and organisational innovations in the natural gas sector gain important advantages for all economic agents by increasing acquisitions and by decreasing the costs. In this context, main aim of this study is to put fourth the strategies to develop innovations in the natural gas sector.

**OP-450**

**Work Related Emotions and Institutional Change: The Case of Environmental Innovation**

*Magali Delmas<sup>1</sup>, Sanja Pekovic<sup>2</sup>*

*<sup>1</sup>Magali Delmas Ucla*

*<sup>2</sup>Sanja Pekovic U. Paris-Dauphine*

Research on innovation has exposed important paradoxes that are central to the nature of creativity. One of these paradoxes is the tension between the impact of positive and negative emotions on the creative process. In this paper, we explore the possibility of reconciling these paradoxical views by investigating the conditions under which job strain- the perception of the lack of control of one's own work and a highly demanding workload- both inhibit and enhance institutional change via environmental innovation. Using a sample of 4,640 French employees from 1,764 firms, we identify how individual emotions related to the work environment are associated with firm-level environmental innovation. Our results show that positive emotions resulting from job satisfaction (measured by social interactions and pay-level satisfaction) counteracts the effect of negative emotions from job strain (measured by high work-pace and overload) on environmental innovation. Our findings highlight the importance of employee's emotions on environmental innovation, and suggest that managers can promote environmental innovation through employee's positive emotions.

**OP-451**

**Behavior of Aspect Ratio AIB2 Flakes on Al-B Alloys**

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In this study, production of boron particles in reinforced aluminum metal matrix were investigated. Borax powder (Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·10H<sub>2</sub>O) was added to molten aluminum at 1000 °C to fabricate AIB2 compounds, which is peritectic temperature on Al-B phase diagram. The cast Al-B alloys were cooled in water, air and furnace. Heat treatment process was applied to cast Al-B alloys by heating in the furnace at 500 °C to acquire high aspect ratio particles in different holding times 1h,2h, 3h and 4h respectively. In the previous studies, some investigations have been made on the different behaviors of Al-B alloys, but there are not adequate technical achievements how aspect ratio effects the mechanical and physical properties of Al-B alloys. The main objective of this investigation is to explore effect of aspect ratio on the mechanical properties of the cast Al-B alloys. The cast Al-B alloys which have different aspect ratio were produced. The microstructure of the Al-B alloys were observed by using microscope to measure aspect ratio of the samples. All samples were subjected to mechanical tests such as tension, hardness and impact tests. Microstructural changes were also observed.

**OP-452**

**Renewable Routes to Zeolite Synthesis and Their Modification**

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Renewable Routes to Zeolite Synthesis and their Modification  
Different Zeolites crystallites were prepared in a microwave oven in 5-20min, whereas ≥24 h are required by conventional heating techniques depending upon the lattice Si/Al ratio. And the results were compared to those obtained by conventional heating under similar conditions. As synthesized zeolites were modified by desilication and dealumination via treatment with NaOH and Oxalic acid respectively to produce hierarchical form with combining the native micropores and a secondary network of intracrystalline mesopores. The synthesized zeolite materials were characterized using IR, FTIR, XRD, XRF, and SEM.

OP-453

**Experimentation on Early Introduction of a Hands-on Component Into Mechanical Engineering Education: Tinkerers' Laboratory (T-Lab)**

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"Hands-on" experience is today one of the most critical skills that employers often seek from entry-level engineers. While the lack of such skills has often been acknowledged by students, educators, administrators, employers, and practicing engineers alike, especially in developing countries, secondary education leading to engineering programs are extremely test-driven. In this presentation, a cost-effective approach is outlined to address this challenge, and a recent experience in a newly-established university in Turkey, Abdullah Gul University (AGU), is shared and discussed. In the process of shaping a novel mechanical engineering program for AGU, an informal polling among the industrialists in Kayseri quickly revealed that the lack of hands-on experience of incoming entry-level engineers and the associated lack of risk-based experimentation was one of their recruitment challenges, leading to lower starting salaries. Tinkerers' Laboratory (T-Lab) is designed as a low-cost extracurricular program/activity to expose incoming. The basic idea of the exercise is to mimic the standard practice in the first year of medical schools, an Anatomy Cadaver Laboratory, in which human bodies are dissected. The key features of T-Lab and their learning objectives (LO) are as follows: (i) locating and receiving specified types machines and devices from local companies and government offices (LO: communicating needs, interacting with technical staff and officials, and mimicking the activities of a receiving department), (ii) storing and classifying donated machines and devices (LO: taking responsibility, self-managing and utilizing internal resources), (iii) determining the leadership of the T-Lab and organizing "dissecting" sessions (LO: leadership, planning, scheduling, team work), (iv) Conducting dissecting sessions (LO: analyzing an engineering system, familiarizing with common components used in modern machines/devices and integration methods, developing manual skills with common tools), and (v) Reporting outcomes (LO: reporting, documenting, developing presentation skills). As the activity is not requires, no formal assessment plan is reported.

OP-454

**Main Role of Technology in Our Life**

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The main advantage of the new technology increase production, as well as more efficient use of mineral raw materials, and environmental preservation. The acceleration of technological progress in the modern industrialized countries. Thus the competition, forcing countries to introduce new technology is constantly production.

1) bioethics 2) science ethics 3) Environmental Ethics 4) changing technology and ethics of nanotechnology, 5) the ethics of sustainable development  
1. Computerization all areas of human activity, is equipped with computers. 2. automation -world truly revolutionary changes taking place in the industry, the pruning process of making science "mexatronics" based on the widespread use of "re- industrialization" got its name. Program management tools combined with industrial robots, automation of the production, increase labor productivity, contributes to improve the quality of the product. The profile of the industry in the number of robots in Japan, the US and Germany occupies the second and third places. The number of new drugs and biotechnology products in the world market, which is growing in size. Breeding and genetic engineering of biological and technical progress of the new methods to increase productivity in agriculture, but also allows the improvement of animal and bird species. Special remark article, bio and electronic technology in Japan as a combination the "Bioelectronics" The project is of particular interest. The development of the industry has played a crucial role in ensuring the health and longevity of people. Cosmication-space research and space is measured in billions of dollars to the science of man-made service market has become the most profitable products. The main part of the US aerospace industry. That require significant resources and scientific potential of this field is a joint activity. In modern times, almost all

of the major activities of the modern era of television, meteorology, navigation, communications and other satellites connected with.

OP-455

**Thermodynamics Anlysis of a New Cylinder Offset Gasoline Engine**

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The gasoline engine has relatively lower efficiency compared to diesel engine because of its lower compression ratio which is limited by the engine knocking phenomena. Being able to reduce the temperature of the end gases during the flame propagation can prevent engine knocking and therefore, the engine can run at higher compression ratio. In this work, a new designed engine named 'HBO' and patented by Ozdamar, (2006) will be introduced. The engine has an offset crankshaft-connecting rod mechanism from the central axis of the cylinder. The kinematic analysis of this new engine configuration showed that compression stroke is carried out faster than the expansion stroke allowing more time for the combustion process. This design allows more heat energy to be released during expansion and reduces the engine-out emissions relative to traditional engine. In order to further understand the concept and the difference between HBO engine and traditional gasoline engine a thermodynamics model based on Wiebe function for heat release rate has been developed to predict the gas pressure and temperature inside the combustion cylinder at different compression ratios. The rate of heat release and the location of the maximum pressure relative to the top dead centre for HBO and traditional engine are assumed similar. The results showed that the gas pressure of HBO engine increases with the rise of compression ratios while the temperature decreases. The low temperature is attributed to the low gas volume relative to that of the traditional engine due to the higher compression ratio and the new engine configurations. The low gas temperature explains why the new engine can run at a higher compression ratio without knocking. The current work introduces a conceptual framework that explains the reasons of having superior performance of HBO engine in terms of lower fuel consumptions, higher torque and power.

OP-456

**E-Commerce Service Quality and Loyalty in Malaysia Hotel Industries**

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E-commerce had expanded the business into a global environment and plays a critical role in managing business strategically. E-commerce has the potential to design according to the different types of organizations in various industries, including the hotel industries. The tourism industry is the largest industry-based services. E-commerce can provide a unique application in the tourism industry in general and especially the hotel sector to further develop the services provided. Managing customer loyalty as a result of the use of E-commerce service quality in the long term is very important in view of the increase in the number of foreign tourists of Malaysia. Commonly, service quality is defined as the level of the delivered service level meets the customer expectation. Therefore in terms of E-commerce, service quality is whether the service provided by the hotel website meets the expectation of E-commerce customer or not. This paper discuss on the E-commerce service quality and tourist loyalty in Malaysia East Coast hotel industries. Towards a comprehensive understanding of E-commerce service quality among foreign tourist in Malaysia East Coast hotel industries, quantitative research using a questionnaire as a research instrument was adopted. The preliminary survey has identified that E-commerce service quality are influenced by perceived user interface quality, perceived product, perceived security risk, and perceived privacy. When the hotel industry successfully provided E-commerce service quality, loyal customers will be formed. The findings generated from selected foreign tourists in Malaysia East Coast hotel industries reveal the preliminary survey. All the identified factors or aspects

were further included in the main survey towards improvement of E-commerce service quality in Malaysia hotel industries. At the end, this study is expected to help hotel industries to improve their E-commerce service quality, which in turn will produce E-customer loyalty in Malaysia and also in Asia.

**OP-457**

**Mediating Role of Team Perception and Self Organization in the Effect of Organizational Creativity on Team Performance**

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Self evaluation of the employees and teams do not just support to increase their knowledge about their work; but also make them produce creative ideas indirectly through increasing their intrinsic motivation. Results of the empirical surveys show that working environment and intrinsic motivation have mediation effects on the relationship between the creativity of the employees and teams and their performance. Previous studies remark that self evaluation of the employees have positive effects on company performance; but creativity is another part of the company performance and the influences on company performance and creativity are different. Therefore, the scope of the creativity studies should be enlarged with the aim of understanding its influence on teams and organization along with the individualistic sides. But the literature is limited about the influence of creativity on teams and organizational performance. This study, aim of which is to understand the mediating factors in the positive effects of creativity on company performance includes theoretical and empirical findings. Results of the study reveal that team perception and self organization have different mediating effects in the relationship between creativity and team performance. Self organization have two factors which are self management and adaptive organization. There are strong and positive relationships between organizational creativity and team perception and self management. These variables also affect team performance in the organizations positively. The positive effect of organizational creativity on team performance and self management reflect to the team performance positively. But the other factor of the self organization, which is adaptive organization has no mediating effect in this relationship.

**OP-458**

**Uncertainty Amidst Change; Impact of Privatization on Employment Opportunities In Pakistan**

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This empirical study evaluates the impact of privatization on employment opportunities in Pakistan. It also intends to examine the relationship among competition, innovation and investment with employment opportunity because privatization leads to competition, investment and innovation in the organization. The problem is that privatization not always increases employment opportunities because literature shows both positive and negative effects of privatization on the organization structure as well as on the economy. In line with the requirements of the research, descriptive statistics have been used with the help of a cross-sectional survey. Research design will be descriptive type of study. The results of this paper shows that there is positive relationship between privatization and employment by injecting new investment, introducing better management, improving competitiveness, and leaving more money in the hands of the public, is likely to result in increased employment opportunities.

**OP-459**

**Job Complexity vs Job Elimination**

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Technological developments have enabled replacement of or all-together elimination of less-skilled labor. Existing literature shows that some jobs will inevitably cease to exist due to advancements in technology. Many studies suggest different paths through which this technology-enabled transition proceed. In this study we give a brief literature review on how technological progress can eliminate many types of jobs. We then purport to analyzing potential effects of such elimination on an emerging market economy. We conclude with our findings and some guidelines for policy makers.

**OP-460**

**Reverse Mentoring Application to Develop Potential of Human Resource**

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Researches in mentoring have steadily increased over the last 30 years. Traditionally, mentoring relationships have consisted of an older and senior executive (mentor) providing advice and counsel to a younger, junior colleague (mentee). Reverse mentoring, turned this formula on its head, is defined as a younger, junior employee acting as mentor to share expertise with an older, senior colleague as the mentee which is the key difference from traditional mentoring. Because of the increasing number of millennial employees (generation Y) and the baby boomers who are each roughly twice the size of Generation X, finding new ways to develop relationships between these groups have been a necessity for organizations. Accordingly, reverse mentoring is accepted as an innovative and cost-effective professional development tool that encourages learning and facilitates cross-generational relationships. As difference form traditional mentoring programs, reverse mentoring has a dual focus on the leadership development of both mentor and mentee.

Junior employees as Millennial mentors have the opportunity to demonstrate capabilities as leaders. It also gives them insight into the higher levels of the organization. In addition, senior organizational members can understand younger generations, can gain a cross-cultural global perspective, can acquire technical knowledge, usually in the field of information technology and internet communications and can learn about current trends. It has been seen that there has been rather insufficient management research on reverse mentoring in literature. The main aim of this study is to fill this gap forming a theoretical basis on reverse mentoring. Also it has been aimed that putting how it is similar to and different from traditional mentoring and giving information about key considerations in creating a reverse mentoring program, intending to develop potential of human resource, for researchers and human resources practitioners.

**OP-461**

**The Role of University in Industrial Cluster Emergence: The Case of Jewelry Cluster in Sa Kaeo Province, Thailand**

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Industrial cluster development has long been a tool to promote and sustain community and regional economic growth. The strategy of the cluster in gaining ability to compete is the flexible specialization and networks of inter-firm linkages among the local community. Local government, trade association, international agent such as UNIDO, and university are the major players in

creating successfully clusters with ability to compete in the global economy. The intervention of both government and non-government organizations can give impact to the cluster emergence process. Particularly, the university has recently become a leading player to support the emergence of local cluster through its knowledge and innovation. Many researches showed many examples of clusters, especially high technology clusters, growing from university's researches. From many cases, it can be claimed that university can stimulate the emerging process of a cluster. Therefore, this research aims to examine the role of university in promoting industrial cluster emergence. A project by Srinakharinwirot University tried to initiate the emergence of a new jewelry cluster in Sa Kaeo province, which is one of the low-income provinces in Thailand. The particular concern is the attempt of the university to support creation of the cluster, the process of the university in transferring the knowledge of jewelry making to an unskilled labours in local community, and to the extent of the university can be a major player in emerging Sa Kaeo jewelry cluster. The analysis of the case is based on face-to-face in depth interviews with representatives from local community, university and local government.

**OP-462**

**The Validity and Reliability of the Turkish Version of the Work Volition Scale**

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People with high levels of work volition would likely perceive an expanse of potential job opportunities and few familial, financial, or structural barriers to pursue these opportunities. Therefore to measure and evaluate the work volition levels of workers and managers is an important issue. The aim of this research is to examine the validity and reliability of the Turkish version of the Work Volition Scale (Duffy, Diemer, & Jadian, 2012). Participants were 211 workers. Firstly, the Work Volition Scale was translated into Turkish by three academicians. Secondly, the Turkish form was back-translated into English and the consistency between the Turkish and English forms was examined. Thirdly, Turkish form has been reviewed by five academicians. Finally they discussed the Turkish form and along with some corrections this scale was prepared for validity and reliability analyses. In this study confirmatory factor analysis was executed to confirm the original scale's structure in Turkish culture. As reliability analysis internal consistency coefficients and the item-total correlations were examined. The results of confirmatory factor analysis indicated that the 16 items loaded on two factors and two-dimensional (volition and constraints) model was well fit ( $\chi^2 = 160.89$ ,  $df = 99$ ,  $RMSEA = .056$ ,  $NNFI = .91$ ,  $CFI = .93$ ,  $IFI = .93$ ,  $GFI = .91$ ,  $SRMR = .077$ ). The Cronbach alfa internal consistency reliability coefficients were .82 for volition subscale, .71 for constraints subscale, and .78 for overall scale. Overall results demonstrated that the Work Volition Scale could be named as a valid and reliable instrument that could be used in the field of organizational and industrial psychology.

**OP-463**

**Pedagogical and Psychological Implications in Teaching ESP**

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Language is taught as a tertiary subject in many departments in the Algerian universities, like the department of biology, economy, demography, sociology, psychology, etc. It is, accordingly given a status of an additional subject whose objectives are blurred and uncertain. Consequently, the English teacher's task becomes ponderous and demanding for the identification of the learning objectives and selection of the teaching material. Hence, needs analysis becomes crucial in such instances. The present paper highlights a crucial issue in the department of sociology concerning the ambiguity of the learning objectives, the absence of the teaching material and their impact on the students' attitudes and the learning setting as a whole. The study concerns first year students in the department of sociology where English is taught as a secondary subject. The findings are alarming and reveal the unfavourable teaching and learning conditions which affect the students' attitudes towards learning the target language.

**OP-464**

**Science Diplomacy Network for Turkey: An Integrated Approach for International STI Cooperation**

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The process of internationalization of science, technology and innovation (STI) has accelerated continuously through the past decades. The rapid increase in research and innovation resources outside combined with Turkey's relatively weak linkages to advanced or emerging research and innovation hubs in Europe, Latin America, Asia and Africa, and the benefits offered by international cooperation in STI, underline the urgent need for strategic policy action. New challenges have generated a need to modernise their institutional structures and the ways in which they go about evidence based policy making and international cooperation in STI. With regard to qualitative data collected from more than 20 expert interviews with science counsellors, policy makers, academicians, and representatives of STI network, and comparative analysis of ten country case studies, the governments require to adjust rapidly to these changes. Deadlocked Turkey's recent efforts of introducing specific policy measures to internationalization of STI can find new impetus. Now, the establishment and reinforcement of the Science Diplomacy Network for enhancing the learning capabilities, absorptive capacity, R&D and innovation capabilities of stakeholders in the country will be alternative policy measure for Turkey. In general, the findings based on good practices and successful methodologies underline the distinctive contribution of SD network as a new policy mechanism to strengthen international cooperation in STI. Therefore, developing and maintaining knowledge diffusion mechanisms is vital to strengthen the research infrastructure of countries that face aforementioned challenges.

**OP-465**

**The Efficacy of Technology Development Zones Creating of University Spin-off Companies: The Case of Turkey**

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We live in a rapidly changing global competitive environment, in this environment countries must increase their ability to produce new knowledge and to commercialize it. The commercialization of knowledge is an important issue in the economic development of countries. Both Technology Development Zones (TDZs) and University Spin-off Companies (USOs) contribute economic development of countries. They have a big role to create innovation and new technologies through the agency of their research and development activities. USO companies which are established by an academic entrepreneurship are ways for commercialization of university researches owing to professional team workers, educational staff and academic research discipline. In this instance, universities, industries and public cooperations must be provided, and also university, industry and public should put their existing opportunities together for scientific, technological, economic developments. TDZs have a key role to provide cooperation between university, industry and public. They promote research-based industrial and innovative activity, and supply flow of knowledge and technology transfer. They encourage academics, students, new graduated students and their new ideas which can be turn into commercial goods and services to set up USO companies. The main purpose of this study is to determine the role of TDZs to set up USO companies in Turkey. Our analyse focus on four groups which are TDZs which were established in Turkey, university which are cooperation with TDZs, region and public expenditures to explain how TDZs are effective creating of USO companies. We will do econometric analysis to determine results by using Logit Regression Analysis (LRA).

**OP-466**

## **Science-Technology Innovation Policies in Algeria: An Assessment**

*Abdelkader Nouibat*  
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The research will focus on the role of government in managing science and technology policies in Algeria. As the country opted for small and medium enterprises to carry its privatization policies, Algeria also embarked on the search for a new model to define new science and technology policies based on government, university and industry collaboration. Two major themes will dominate the research: the nature of the government-university-industry collaboration model and the results of the model as it is applied to enhance industrial innovation in Algeria.

**OP-467**

## **Which Strategies are Most Effective For Kindergarten English Language Learners?**

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This study identifies six different articles to explain which strategies are most effective for kindergarten English Language Learners. The literature review project has information about six different research articles, purpose of the studies, and results of the studies.

There are some different strategies for teachers to use to teach English to new language learners. Every child has different learning style and characteristic. Therefore, teachers should keep in mind while interacting with children. The teachers should create opportunity for all kinds of children in the classroom. Also, classroom environment can be very effective for children's language development, so the teacher needs to create more opportunity for children to develop their language skills and lets them learn. Classroom activities should encourage children's learning. Everybody learns differently, but some strategies might be useful for all the students. The teacher should plan some activities and use some strategies in the classroom, so the children can have opportunities to learn more. And also, the teacher can manage the classroom with maximum student learning time. I think this research topic will be useful for teachers to apply the most effective strategies into their classroom activities to increase students' learning.

**OP-468**

## **His Presentation was The Justice Service Innovation Process (Innovation and the law)**

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In this study, in order to survive in a rapidly changing competitive environment, companies' products, services and production methods are continuously change and renewal are expressed as a process of "innovation" concept of law science and judicial attention will be paid to be associated with public service. The study's priority issues, as a social science law, democracy, fair to be judged and "rule of law" in the sense of changing, depending on the condition in the process of innovation and change in the interpretation of is to discuss. Today, finds the area of application in e-Government, e-signature, e-democracy and legal infrastructure and processes of change, such as proficiency UYAP convey the improvement of justice services in the public sector and improving the management of information in this field, the importance of innovation for offering this service is to share with the public.

**OP-469**

## **Designing Public Policies to Support the Innovation Capacity of SMEs: A Theoretical Model Based on Innovation Profiles**

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It is very crucial for companies to follow sustainable and competitive growth strategies in order to survive in the global market. To achieve this end, an adequate level of innovation output should be produced. In the matter of innovation, SMEs, which constitute a great part of enterprises in terms of number, faces with bigger and more diverse obstacles than large enterprises. In order for SMEs to overcome these obstacles, public policies that encourage innovation are encountered in many countries. If these policies could be designed on the basis of "innovation profiles" of the companies, more successful results will be obtained in terms of effectiveness and efficiency. In this study, a theoretical model aims at defining innovation profiles of the SME is proposed to form a basis for an effective and efficient support policy. The proposed model aims to determine innovation profiles and levels of SMEs and to offer different strategic roadmaps that could be followed so as to increase SME's output of innovation activities. More, the proposed roadmaps are intended shape new public support tools. It is believed that, in this way, it would be possible to contribute more (transformation of the output to the effect) to the technological development process and international competitiveness of SMEs in developing countries.

**OP-470**

## **Hybrid Based Collaborative Filtering with Temporal Dynamics**

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Hybrid-based collaborative filters use some part or entire database relating to user preferences for making recommendations for new products and new users. In our time, it is of utmost importance to make recommendations in line with interests and demands of users by making their interest alive. However, although Hybrid-based collaborative filters are used in this area, changing of preferences of users in a time, emergence of new products and new users overshadow success of such systems. Traditional hybrid-based collaborative filtering (CF) technique become insufficient for responding interests and demands changing in a time. For this reason, temporal changes in recommendation systems become an important concept. Together with the study conducted, an appropriate and new method has been developed in line with changing pleasure and demands depending on time. In the recommended system, unlike traditional hybrid technique based CF technique, point given to the products depending on dates scored by users has been attempted to be estimated. Ages of existing scores have been reinforced by using various conversion functions and have been aged. In this study, process has been made over netflix data for measuring success of both traditional hybrid based CF technique and the recommended system. Quite successful and rewarding results have been obtained in the issue of accuracy of predicted points.

**OP-471**

## **A Framework for Integrated Health Care Services in Postnatal Care Via MyPostnatalSys - an Integration of Western and Traditional Malay Medicine**

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This paper shall propose MyPostnatalSys as a flexible framework to integrate the services of Traditional Malay Medicine (TMM) with modern medicine in the field of postnatal care.

Traditional medicine systems and western medicine are being treated in different systems and in isolation. MyPostnatalSys is proposed to integrate the services of these medicine systems via electronic health records, and usage of

mobile and web based technology. Patient can access integrated healthcare services seamlessly and experience a more holistic treatment. Healthcare providers shall also benefit from the standardization of information exchange with other healthcare providers.

## OP-472

### Temperature Forecasting Based on Radial Basis Function Neural Networks

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Time-Series analysis and forecasting are one of the interesting areas in which past-data could be used to anticipate and predict data and information for the future. Accurate weather forecasting is very important for planning day to day activities. Artificial Neural Network (ANN) has been used for numerous applications, including weather forecasting. In this paper, ANN approach for forecasting local weather in Misurata city (Libya) is presented, based upon various factors obtained from meteorological experts. The Neural Networks model supports different types of training algorithms. One such algorithm is radial basis function (RBF). The RBF neural network was used to test the performance in order to investigate effective forecasting technique, and forecast time series that consists of air pressure, relative humidity, dew point, wind direction, wind speed as an input variable. The RBF neural network trained on the past-dataset of the chosen country to forecast the air temperature. The obtained results were compared with real values from the meteorological department of Misurata city. Finally, The performance and reliability of the model evaluated by a number of statistical measures such as Mean square Error (MSE).

## OP-473

### Support Vector Clustering for High Precision Classification: Application on Fingerprints Clustering

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Many clustering techniques are used today such as kmeans, hierarchical, genetic algorithms... etc. and for various applications. The Support Vector Clustering method is a very accurate method has appeared in recent years, which is derived from the method of support vectors machine. The method is based on the mono-class SVM method for grouping samples and then labelling them using Bresenham algorithm used for drawing segments on screens. In this work we present the use of this technique in 3D space by an extension of the Bresenham algorithm then we study the accuracy of the method in the case of segmentation of fingerprints for the discovery of eventual relations between close people such as brothers, families, etc. The results show firstly the high accuracy of the SVC method and the possibility of its tuning through the RBF kernel parameters and on the other hand the possibility of building decision models for the recognition of genetic origins of persons.

## OP-474

### Web Mapping to Locate the Risk of Disease Spreading of the Disease

*Andino Maseleno*

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This paper presents how to develop a realistic and useful Web mapping for displaying maps on a screen to locate the risk of disease spreading of African Trypanosomiasis disease that can be of real usage. Fuzzy Logic and Dempster-Shafer belief theory in the context to find the highest basic probability assignment of the risk of disease spreading of African Trypanosomiasis. The web mapping server is the engine behind the maps. The mapping server or web mapping program needs to be configured to communicate between the web server and assemble data layers into an appropriate image. A map is not possible without some sort of mapping information for display. Mapping data is

referred to as spatial or geospatial data and can be used in an array of desktop mapping programs or web mapping servers. Mapping data in this system uses spatial and non-spatial data in ArcView format. This research has shown good result that the map can be displayed as the visualization of the risk of disease spreading of African Trypanosomiasis. The risk of disease spreading of African Trypanosomiasis in areas which include Angola, Botswana, Congo, Congo DRC, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe.

## OP-475

### Proposed Smart Traffic Control Signal in Brunei Darussalam

*Andino Maseleno*

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This paper presents proposed smart traffic control signal in Brunei Darussalam. Traffic congestion due to stops and delays at traffic light signals has much been complained about in Brunei Darussalam as well as across the world during the recent years. There are primarily two types of traffic signal controls in Brunei Darussalam. The most common one is the fixed or pre-timed signal operation traffic light and the other one is the actuated signal operation traffic light. Although the actuated signal control is more efficient than the fixed or pre-fixed signal control in the sense that it provides fewer stops and delays to traffic on the major arteries, the best option for Brunei Darussalam would be to introduce smart traffic control signal. This type of traffic signal uses artificial intelligence to take the appropriate action by adjusting the times in real time to minimise the delay in the intersection while also coordinating with intersections in the neighbourhood. Smart traffic control system employs the "game theory" to work. In Brunei Darussalam, where we have numerous intersections where several arterial roads are linked to one another, The SMART-Signal traffic control method should be implemented.

## OP-476

### A Version of Parallel Odd-Even Sorting Algorithm Implemented in CUDA Paradigm

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Sorting data is an important problem for many applications. Parallel sorting is a way to improve sorting performance using more nodes or threads e.g. dividing data in more nodes and perform sorting in each node simultaneously or including more threads in process of sorting. It was experimented with one type of those sorting algorithms, namely the well-known sorting algorithms called Odd-Even sort. This paper describes a modification form of the above mentioned algorithm. Namely, the algorithm modification consists in the ability to work with the blocks of elements instead of working with individual elements. This modification is done with the idea to make it in a closer form for use of the CUDA technology. Both theoretical and experimental analysis of Odd-Even sort algorithm together with its parallel implementation is done. For experimental purpose, a GeForce GT 645M with 2 GB memory is used. The programming language C++ with CUDA 7.0 paradigm is utilized to implement Odd-Even algorithm and the results indicated that sorting of integers in CUDA environment are dozens of times faster.

## OP-477

### Client Cyber Threat Risk Management Model

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With the advanced technology, the frequency of use of computers and information systems has increased. Adding increasing use of internet to that has emerged Cyber World as a concept. First public and private companies, then individuals must do their share in protecting themselves from cyber

threats that are bound to come with the cyber world; ensure personal safety and protect their privacy. They need to realize that these precautions are essential for their lives. Generally, this awareness in corporations and organizations is created by general security measures applied to the network structure. However securing the network is no longer sufficient, also the client computers should have measures taken against cyber-attacks. Our study is focused on the security measures that should be taken on an end-user system. In connection to that, it creates a model that computes the probability of a successful cyber-attack on a particular client system and the risk values by using logistic regression and frequency analysis. This model has been developed based on a synthetic data-set that contains a variety of values in security setting parameters (end user exiting the system without logging out, using weak passwords, time spent during internet surfing, leaving unused ports open, etc.). This data-set contains the security parameters used in CSJGS Simulator (Cyber Security Joint Game/Gamification System). CSJGS project aims to provide Cyber Security Training for IT personnel by focusing on personal computer systems and network, via rule based simulation & modeling. Additionally, the study examines whether this model that provides the security and privacy of the end user is consistent with the risk analysis section of ISO27001 family. The purpose of the model in CSJGS is to calculate the risk probabilities and the insurance cost of a company facing a cyber-attack. Therefore CSJGS will serve in measuring the consistency of the model.

## OP-478

### A New Segmentation Approach to Uighur OCR

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Uighur alphabets, which were produced based on Arabic script, are not completely identical with the Arabic alphabets in many aspects. Therefore, there are requirements to research the Uighur OCR separately from Arabic OCR research. Arabic OCR is also still an open research field in OCR techniques due to the technical difficulties included by the cursive nature of the Arabic script. In general, the functional core of Uighur or Arabic OCR system consists of character segmentation and classification. Classification or recognition of the segmented pictures of characters is not a complex problem for our present technology in computer vision and machine learning. However, segmentation point at the Uighur and Arabic word or sub-word is a subjective point that very hard to calculate correctly. The character segmentation is still a challenge for Uighur and Arabic OCR research and the results of segmentation step would determine or greatly affect the accuracy of classification. So, in this paper, we intensively focused on the segmentation process and presented a new approach to calculate the segmentation point more easily, correctly and clearly. As to the classification, we have used machine learning methods, just like backpropagation algorithm and LDA approach after extracting the features from the characters. The system has been implemented and it has achieved a recognition rate of 95% using 60 pages letters.

## OP-479

### Comparison and Transformation of SQL to NoSQL

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Coping with data whose volume is continually increasing is a big challenge nowadays. Although the traditional approach with relational database will continue to be part of data modeling, storage and processing, the NoSQL data models are gaining more ground in the big data story. NoSQL is not a substitution of the relational model, but, it is a complementary part able to cope with big data as the world is seeking new technologies to manage big data for utmost business value. NoSQL data models and systems, with more liberal and unstricted schema are used more and more to publish vast amount of data. The aim of this paper is to compare and contrast relational data modeling with NoSQL modeling. The experimentation with some of NoSQL database systems reveals some good practices of transforming a relational database to NoSQL.

## OP-480

### Comparative Analysis of Mobile Travel Information Systems

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In this study, commonly used mobile travel information systems are being examined in terms of meeting the customer satisfaction and support investors' decision making process with the help of comparative table analysis consisting of financial, technical and functional features.

These systems consist of five key elements. They are; hardware, software, database, human and processes.

Customers are in need of real time data more to plan their travels, products, services, accommodation and transportation. Supply chain and mobile travelling information systems integrated with the value added logistic systems provide vast opportunity for improved mobile technologies to be implemented and become prevalent.

Mobile travel information systems offer customers a real time data to for their plan, control and decision support.

These systems improve safety and provide convenience while travelling with the help of various transportation methods and accommodation options.

Mobile travel information systems provides support service to the passengers anytime anywhere. In addition to this, these mobile systems develop public transportation, accommodation and travelling methods by reforming the service quality. In this study, USA-based Expedia and Priceline which provide flight and accommodation service have been examined.

Mobile travel information systems have equalized recently their challenging opponents from the sector and overtake the mobile travelling systems market. Strengths and weaknesses of these two mobile travelling information systems which are the dominant elements of the market have been examined over the comparative tables analysis.

## OP-481

### Understanding Engagement Motivations for Using Computer Assisted Groupware: Using Qualitative Research for Eliciting User Requirements

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Knowledge intensive economies are grounded in social environments enabling the production, dissemination and consumption of information and knowledge. Mobility and flexibility in terms of organization, space and work is essential in such environments. As the boundaries between internal and external environments converge, collaboration of multiple stakeholders engaging in the accomplishment of complex tasks becomes a fundamental organizational issue. Usually, these stakeholders do not share the same physical locations and use diverse means for knowledge sharing purposes. Managing knowledge produced in such dispersed locations and means is essential for the maintenance and productivity of knowledge work. Effective apprehension, development, deployment and utilization of collaborative knowledge require integrative tools to achieve objectives. Computer assisted collaborative tools are increasingly becoming popular for addressing such requirements during the collaborative activities and their coordination. These tools help people in remote locations to work together on a single platform which enable its users to classify and retrieve information when necessary. Integrating services such as calendars, instant messaging, shared database access, and electronic meeting activities can provide collaborative knowledge work with important support. However, present tools developed for such purposes are not used to their full potential. If overcoming cultural issues during the use of these tools are not considered, then they become inactive after a short period of time. The aim of this study is to explore this phenomenon by investigating the experiences of groupware users in collaborative projects. To understand what hinders or motivates users to be more engaged using these tools, we have conducted in depth-interviews with various stakeholders in different organizations. Finally, we have thematically structured the interview data for obtaining a semi-structured interview guide for eliciting the requirements necessary for the conceptualization of an online collaboration tool. This study provides an exemplary method for system designer-social researcher interdisciplinary studies.



OP-482

**How Sources of Information Influence the Novelty of Product and Process Innovations: Turkish Manufacturing Industry**

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Accessing and using external information are important for firms to generate innovations. It is expected that the sources of information used by the firms influence the capabilities of firms to create new-to-market innovations. In other words, firms which can utilize the external information are expected to generate more radical or new-to-market innovations. This paper uses the data which was collected by Turkish Statistical Institute to measure the innovative activities of firms in the period between 2010-2012 for analyses. The dataset used for this research includes data of 1855 manufacturing firms which had attempted to make product or process innovations in the given period. Focusing on manufacturing industries in Turkey, this study supports that in radical (new-to-market) product and process innovations, information spillovers from universities and public laboratories play an important role. The internal and external research and development activities are other factors which positively correlate with the radical (new-to-market) innovation activities of Turkish manufacturing firms.

OP-483

**Design Management in Creating Competitive Advantage**

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Design management is an increasingly important concept for business. Studies on design management have quantified the contribution that design makes to company performance. The aim of this research is to analyze the effect of design management and design investment on company performance with competitiveness perspective and how this relationship is mediated by design management.

Regression tests was used to test the research hypotheses on a data set from the Ankara Sitelur Furniture Industry. Results suggest, first, that design management enhances firm performance. Second, this research also provides empirical evidence that investing in design is positively related to design management. Third, design management plays a significant role in determining the effects of design investment on firm's growth and profitability performance. Companies that manage design effectively and efficiently attain better performance than those that do not. Therefore, good design does not emerge by chance or by investing in design but rather as the result of a managed process.

OP-484

**The Impact of Network Intelligence to the Success of Business Decisions**

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The aim of this paper is to investigate the extent to which individual components of network intelligence do affect the success of business decisions in the process of managerial decision making. Network intelligence, as one of the important components of human intelligence in general, is the ability of a network view of the nature, society and business. In this context, the concept of network intelligence, as a framework within which it is possible in a different way to understand and solve many problems, we present as a management tool for making better business decisions. For the purposes of this research, the success of a business decision, due to impossibility of its comprehensive measurement, is understood as the functionality of the decision, as only one of the elements for success of a decision. The research methodology is the application of inductive method of building an expert system, i.e. a knowledge based system (Doctus Knowledge-Based Expert System Shell) or conclusion on the degree of informativeness (a key impact on functionality of decisions) of individual

components of case based spiritual intelligence (Case Based Reasoning). This work is a try to - with the help of an expert system - single out, from a number of components of spiritual intelligence, those that are critical to the success of a business decision, and that in some future researches more attention is paid to the impact of these components on the efficiency of decision making.

OP-485

**The Effect of Product Innovation and Aesthetics on Brand Loyalty and Brand Trust: The Case of Technological Products**

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As technology progresses with an enormous speed and innovation in every aspect of technology is introduced, innovation and aesthetics in technological products has to be distinguish themselves from competitors. Especially in technological products, customers expect a certain level of innovation at every new version of a product. In the past, colors such as grey and black was the dominant color in technological products. This was believed to create a product image as high tech to customers. Mostly, these products were unaesthetic. However, in the last years, it is observed that a technology product can be both aesthetic and high tech. The perception of customers towards a particular brand is always important for the companies to differentiate themselves from other brands producing similar products. In this research, we investigate the effect of product innovation and aesthetics on brand loyalty and brand trust. We use smartphones as our case study.

OP-486

**Measurement of Human Capital for Information Technology Departments**

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When calculating corporate capital, measuring intangible assets are as important as measuring tangible assets. Intellectual capital is considered as the main intangible asset of a company today. Intellectual capital mainly consists of process, innovation, customer, and human capital. Today, the information technology capability is an important factor in achieving competitive advantage for many companies in various sectors. Companies have to build and sustain a capable information technology department to build, maintain, and improve their information technology infrastructure. Naturally, a proficient IT department consists of capable IT professionals with the right education, training, skills, and experience. In this paper, we develop a metric that shows the human capital value of an IT department in an organization. The metric will help the managers of the organization to identify the strength of their IT department human resources.

OP-487

**Promoting Energy Efficiency Strategies in Turkey: The Case for Building Efficiency**

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Energy consumption in buildings has been growing in aggregate over time. Buildings represent the largest energy consumption and are responsible for 36% of energy consumption and 32% of CO2 emissions in Turkey. These figures show the importance of energy efficiency efforts in the building sector and increasing energy efficiency by improving building energy efficiency standards has the potential to slowdown the growing energy demand in Turkey. Within this framework the main purpose of this paper is to provide a broad overview of energy efficiency strategies and buildings industry in Turkey. The paper is constructed as follows: After a brief introduction on the subject and a review of the existing literature, the second section deals with regulatory environment related to energy efficiency in buildings from a legislative perspective. Market transformation is an important component of energy efficiency policies and due to this fact in the following section, we aim to

overview the market transformation in construction sector by taking into account the barriers preventing further development of building efficiency. In the last section, current situation and challenges related to building efficiency policies will be analysed and the paper concludes with future policy proposals to promote building energy efficiency strategies.

### OP-488

#### **The Reflection of Culture on Entrepreneurship: An Analysis on Entrepreneurship Culture in Turkey**

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Entrepreneurship is one of the most important dynamics of economical growth for global economies by representing a vital resource through developing new ideas, products and services, generating more efficient production methods and creating new beneficial business models. Due to these nonignorable reasons, there is a growing recognition of entrepreneurship's significance across the world. Entrepreneurship is closely related to potentials of social and cultural structures of a community. Thus, culture is a remarkable component of entrepreneurship and entrepreneurial environment. To encourage more entrepreneurs, a country needs a set of beliefs that promotes entrepreneurship as a respected career choice. In this study, entrepreneurship has been analyzed in socio-cultural context and tried to clarify the relationship between the culture and entrepreneurship. Also, the effects of culture on entrepreneurship and characteristics of entrepreneurial culture are examined. In this context, entrepreneurship culture in Turkey is also analyzed in different extent.

### OP-489

#### **Evaluation of the Maintenance Practices in Mechanized Agriculture – SADC Region**

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The Southern Africa Development Community countries have embarked on mechanizing their agriculture. It is envisaged on the factual basis that it leads to increased labour productivity, reduction in drudgery, creation of employment in Agriculture and other support sectors and increase in farm income. Given that the SADC Governments' rural development focus is based on Agriculture at both small and medium scale level, this research was undertaken to uncover research based information that will inform policy during the resurrection of the agricultural mechanization endeavours. This study assessed the maintenance practices in Namibian, South African and Zambian mechanized agriculture and used the Czech mechanized agriculture maintenance practices as a benchmark.

Tribotechnical Analysis was used to monitor component structural changes based on the fact that wear deteriorates mating functional surfaces of machine elements leading to poor component functional that negatively impact on the environment and the non-cost effectiveness of mechanization in SADC primary agriculture. A fleet of Massey Ferguson and Zetor tractors were sampled at 100-ltr-diesel consumption interval. Oil total contaminants and Cleveland open cup flash point method was used to evaluate the condition of the lubricant while Direct Reading Ferrograph assessed the ratio share of Small wear particles (Ds), Large wear particles (DL) and the Total Wear Particle Concentration (WPC). Extreme value showing samples from the Direct Reading Ferrograph were further investigated using the Ferrograph Analyzer. Data was further statistically analyzed to generate a baseline based nomogram that is being used as a maintenance support tool. Upon recommendation of this study, Ferrography has been introduced as a cost effective proactive maintenance tool at the Tractor maintenance center in Zambia.

### OP-490

#### **A Novel Portable Water Treatment Plant with Trio Effects Working Mechanism**

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Malaysia, being the world largest exporter of palm oil of an annual produce of over 19.2 million tons of crude palm oil (CPO) has contributed to many oil mills been established across the country. With the processing capacity of about 100 million tonnes of fresh fruit bunches (FFB) resulted into an average 13 million gallons of palm oil mill effluent (POME) produced as by-product. Such by products, if not treated could result into great health risk as well as water wastage, a number of research work on the treatment have been concentrated solely on large scale production which could not be accessible to rural areas or small scale treatment, another factor to be looked into is the fact that, most of these studies were carried out with varying conditions and locations, thus, this present work developed a novel approach which combines the three major water treatment process; Primary, Secondary and Tertiary as the latest technology to treat these materials through ultrasound treatment. The treatment plant is made up physical, chemical and physiochemical mechanism of water treatment and could also treat any form of water contaminant depending on some replaceable parts in the plant. The sequence of treatment are sub divided into the following section: Screening-Separation-Grit removal-Aeration-Classification-UV Disinfection, Granular Activated carbon bed, all in one Ultrasonic treatment

### OP-491

#### **Economic Evaluation of Different Techniques for Palm Oil Mill Effluent treatment: A Case Study of Malaysia**

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Malaysia as the world largest exporter of palm oil has witnessed tremendous growth in the palm oil industry with annual production of about 19.2 million tons of crude palm oil (CPO). This growth has resulted to establishment of over 450 palm oil mills, processing 100 million tonnes of fresh fruit bunches (FFB) across Malaysia with 13 million gallons of palm oil mill effluent (POME) as by-product. If the POME from the oil palm mills is left untreated could pose high health risk to the environment. Series of researchers have investigated different techniques for treatment of POME in order to mitigate its adverse effect on the environment with little information on the economic implication of these pre-treatment methods. In this study, different techniques for treatment of POME will be investigated by developing process flowsheet for each of the pre-treatment techniques. Economics evaluation of each of these methods will be carried out in order to determine the cost effectiveness of each of the process route. Comparison will be made between each of the process routes based of the economics and effectiveness of the pre-treatment methods.

OP-492

**Structural Improvement of Train Rail with Different Heat Treatment Process**

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Wear of train rails has great importance in railway transportation safety and railway infrastructure maintenance methods. The proposed basic solutions to prevent rail wear are implementing periodic rail wear control, lubricating rails at specific areas, employing surface treatment for the rail surface, and improving the rail microstructure and rail metallurgy. Rail materials are basically classified according to their hardness values. Without alloying the rail material, the cooling rate is controlled to obtain harder pearlitic structure in rail manufacture. In this study, a high-speed-train railway material was investigated, and different heat treatment processes were applied on the R350HT rail. The effects of different heat treatments were investigated on the mechanical properties (toughness, hardness and wear). Three different structures were obtained with different heat treatment cycles: pearlitic, upper bainite and lower bainite. As a result of Charpy v-notch tests, the bainitic structure has better toughness hardness and wear behaviour than the generally used pearlitic rail steel. The results of the ball-on-disc wear tests show that the upper bainite samples have the best wear resistance among all microstructures.

OP-493

**The Potential of Reliability Centered Maintenance to Improve the Performance of Large Plants**

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The multi-billion dollar chemical plant of FGA in Melbourne, Australia is one the jewels in FGA Chemicals capper. However, the maintenance cost in this company is considerably high. As a result, alternative solutions to the current wait until breakdown approach are required. Reliability Centered Maintenance (RCM) is a corporate level maintenance strategy which can be adopted in order to optimize the maintenance program of a plant or a company. The adoption of such a program clearly defines the maintenance strategies that should be implemented on each of the assets of the plant. In this program, the maintenance strategies will be optimized in a way which makes the functionality of the plant is cost-effectively maintained using maintenance techniques. The aim of this paper is to introduce a RCM program in this chemical plant in order to improve the overall performance of this plant through reducing not just the costs of maintenance but the cost of production and even the cost of the goods and to increase reputation for producing quality goods. The proposed maintenance program will take about three years to reach the target of 87% planned maintenance but measures being taken to improve current breakdowns and increase planned maintenance starting in a week's time improvements will follow soon. The initial costs will be high but with time the maintenance cost as well as the production and labor costs will decrease by more than 30% as in the case of DuPont Chemicals. The current program has made improvement in the following components: the impeller attachments such as the electric motor, gear box, bearing and mixing blade reducing risk by 79%, 70%, 80% and 33% respectively; and the oil tubes in the heat exchanger which reduced risk by 75%.

OP-494

**Methanol Based Extraction of Antipyretic Properties from Aquilaria Subintegra Spp. Dried Leaves**

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Antipyretic is a compound that can reduce the body temperature during fever. Nowadays, most people are using chemical antipyretic to reduce the fever where most of chemical antipyretic content drug that can give side effect to human body. Acetaminophen is one of the antipyretic that can be found in aspirin, paracetamol that easily available in the market to cure fever. The aim of this

study is to discover the antipyretic properties from Aquilaria Subintegra leaves as a source of natural medicine. Aquilaria Subintegra tree is one of the plants that live widely in tropical rainforest climate that traditionally used in reducing pain, rheumatism, fever and asthma. The investigation were carried out at different drying temperature ranging from 40°C to 60°C and methanol were used as solvent in extraction process. High Performance Liquid Chromatography (HPLC) and Thin Layer Chromatography (TLC) have been used to identify the existence of antipyretic properties. Five different concentrations of standard acetaminophen were applied to develop calibration curve which were 120, 140, 160, 180 and 200ppm. Regression coefficient obtained was 0.8547. Based on the HPLC analysis, acetaminophen's peak were appeared in all the extracted samples at minute of 0.90 which conformed with the standard solution. The best temperature to detect antipyretic properties in sample was at temperature 60°C and supported by TLC analysis where the sample and standard having the same height at 6.3cm.

OP-495

**Investigating a Three Dimensional Complex of Polymers-Surfactant-Nanoparticle Additives as Drag Reducers in a Rotating Disk Apparatus (RDA)**

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Polymers and surfactants have been well established as effective drag reduction agents both in liquid transportation in pipelines as well as rotating disk apparatus, but mechanical degradation at high shear forces as well as less effectiveness respectively, have hindered their universal acceptance. A combination of these has greater performance yet limited in some applications and temperature range. The needs for cheap load capacity, good tribology properties and anti-wear in some applications have necessitated the introduction of nanoparticles into the later which give good results. In this work, a new approach which involves a three dimensional complex mixture of Xanthan gum, Silica nanoparticle and hexadecyl trimethyl ammonium bromide (HTABr) were tested as a potential drag reduction, effects of each of these DRAs were investigated, dependence of drag reduction on the turbulent strength from the rotation speed and mechanical degradation resistance in a rotating disk apparatus with over 40% drag reduction. It was also observed that the rigid complex mixture formed were able to reduce drag in comparison to the individual materials.

OP-496

**Life Cycle Assessment of Bioenergy System from Napier grass: Case Study of Small-Scale Farm**

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To enhance energy security with simultaneously reducing fossil energy consumption and GHG emission, renewable energy is an interesting option for diminishing this problem. Napier grass is one of important renewable energy source because Napier grass has suitable to use for producing biomethane. Several studies have reported that biomethane productions from grass can reduce GHG emission and it is expected to be the most sustainable energy. However, some studies states that the grass bioenergy system cannot reduce GHG emission when compared to the modern natural gas power plant. This research aims to investigate the environmental impact of bioenergy production from Napier Pakchong 1 grass in small-scale farm in Thailand by using Life Cycle Assessment (LCA) methodology. One mega-joule of producing electricity was used as functional unit. Environmental performances of small-scale agriculture were evaluated through six impact categories by using CML 2001 method. The result was found that small scale farm has shown lower environmental impact than conventional electricity generation in Thailand (natural gas power plant). Global warming potential (GWP) of small-scales farm was emitted 0.0293 kg CO<sub>2</sub>-eq MJ<sup>-1</sup>. The most contribution to GWP was generated from the losses

of biomethane during operated biomethane production and transportation. In addition, cultivation without fertilizers tends to decrease the greenhouse gas emissions. When compare this bioenergy system with Thai natural gas power plant, electricity production from Napier grass (small-scale) was shown 80% of GWP reduction. Therefore, it should be suggested that the bioenergy system from Napier grass could be one of sustainable ways to produce energy in Thailand.

**OP-497**

**Enhancement of Biogas Production from Acacia Hybrid Leave Using Alkaline Pretreatment**

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This aim of this study was to investigate the effect of sodium hydroxide (NaOH) pre-treatment on increase solubilisation and biogas production. In this study the combined with Response surface methodology of Central composite design (CCD) was employed to optimize sodium hydroxide pretreatment condition of Acacia hybrid leaves for maximizing the biogas production. A maximum biogas yield of 182.19 L/ KgVS was obtained with pre-treated at 3% NaOH, 48 h which was 1.2 times higher than untreated leaves. This result was related to VS and tCOD removal, which was highest at this pretreatment condition. The maximum VS and COD removal were 40.43% and 75.51 %, respectively. BMP results of pretreated leaves at the same reaction time with 24 h was significantly when increasing NaOH concentration from non-pretreated to 1.5 and 3.62% caused an increase in biogas yield of 68.8 %, and 72.2 %, respectively. The chemical composition of the untreated Acacia hybrid leaves was determined to have a total lignin content of 6.53% and maximum decreased to 1.72 % with pre-treated at 3% NaOH, 48 h and 3.62% NaOH, 24 h. The maximum cellulose content was 93.49 % when pre-treated at 3% NaOH, 48 h. Quadratic regression models were highly significant, as it is evident from the Fisher's F-test with very low probability value (Prob > F = < 0.0001 for biogas production and in COD removal the values of Prob > F = 0.0108). The values of R<sup>2</sup> indicate that 98.69% and 83.81% of the variables: NaOH concentration and reaction time contribute very positively to the biogas production and COD removal, respectively. It can be concluded that NaOH pretreatment can improve the yield of biogas production from Acacia leave.

**OP-498**

**Optimization of Alkaline Thermo-Chemical Pretreatment for Enhancing Biogas Production of Acacia leaves by Response Surface Methodology**

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Acacia is one of the fastest growing species in Southeast Asia. It was planted as a source of firewood and good quality charcoal, as well as timber for furniture and pulp for making paper. Acacia hybrid (mangium x auriculaeformis) is currently producing high-quality paper in Indonesia, Malaysia, and Vietnam because of its high yields of pulp and strong characteristic. When trees are cut down for paper production, large amounts of leaves waste are generated. Acacia leaves contain a high fraction of lignocelluloses which can be considered as a potential source of biogas. However, the crystalline cellulosic structure is covered with hemicellulose and lignin which make its structure difficult for conversion to biogas. There are many researchers those studied about the pretreatment methods i.e., physical, chemical, thermo-chemical, and biological pretreatments. These methods can be used to improve the biogas production. Alkaline thermo-chemical pretreatment is a well-known method and it is effective to eliminate the structure of lignin which resulted in increasing of the enzymatic accessibility of cellulose and hemicelluloses. This study investigated the effect of Sodium Hydroxide (NaOH) thermo-chemical pretreatment on chemical composition and biogas production from Acacia leaves. In order to optimize the hydrolysis of Acacia leaves, Response Surface Method (RSM) on two factors and two response designs was performed to optimize experimental conditions. The effects of reaction parameters including sodium hydroxide concentration (0-3% (w/v)) and the experimental time of giving steam at 121 °C and 15 psi (0-30 minute) were evaluated. Biological Methane Potential

(BMP) test were performed on untreated and pretreated Acacia leaves. RSM indicated that the minimum value of NaOH and reaction time was at 1.31% NaOH and 13.58 minutes, respectively. The maximum biogas production was 258.30 L/kgVS (81.88% higher than the control)

**OP-499**

**Biogas Production from Effects of Harvest Napier Grass (Pak Chong 1) (Pennisetum Purpureum x Pennisetum Americanum)**

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The effects of harvest interval on biomass yield, growth components and chemical composition of Napier grass (Pak Chong 1) (Pennisetum purpureum x Pennisetum americanum) as a source of bioenergy in Thailand. Biogas production of Napier grass with respect to maturity at 35 45 and 55 days were examined. The changes in the chemical composition of Napier grass with advancing harvest date in the primary growth were investigated and related to specific methane yields. The highest biogas production of 208 L/kg VS added was found in Napier grass harvested at 45 days compared to 111 and 83 L/kg VS added, respectively, for Napier grass age 35 and 55 days. Additionally, Napier grass age 45 days exhibited the digestibility of cellulose and hemicellulose. Whereas digestibility of cellulose and hemicellulose were lowest for the biomass harvested at 35 and 55 days of maturity. The increase in fiber components and decrease in digestibility with advancing harvest date had a negative impact on the specific methane yield and this impact was similar across the Napier grass. At common growth stages, only small differences in herbage digestibility was observed between the grass and this was reflected in similar specific methane yields. Napier grass composition showed variations with respect to maturation, therefore, affected the digestibility of biomass for biogas production. Thus, to maximize the net energy yield must be conducted and include parameters such as feedstock age and preprocessing strategies. Further studies are needed to refine biogas production of Napier grass cultivars harvesting in different age to maximize biomass yields while ensuring cash flow and minimizing harvesting costs.

**OP-500**

**An Exploration of Green Consumption Consciousness and Behaviour of Families from the Perspective of Sustainable Consumption: A Case Study of Muğla City**

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Each and every dimension of consumption as one of the basic means of survival deserves attention. Rapid technological changes, increases in production, changes in consumer expectations and tastes, differentiation of products and increases in consumer expenditure are just some of the dimensions of the multifaceted structure of consumption. Another dimension of consumption which deserves equal attention is constituted by the consumers who are careful in their purchases, sensitive to the environment, conscious of environmental pollution, supportive for the preservation of natural resources and recyclable production, mindful and conscious of their rights in commodity and services markets. Environmental concerns and sensitivities of recent decades have helped not only the development of green consumption in consumption behaviour but also a consciousness of energy conservation in the face of irresponsible use of natural resources. Nature and humanity are an inseparable part of life on earth and therefore there is an increase in anxiety and fear for the future of humanity. This condition leads consumers to demand more use of sustainable and less polluting resources in production as well as to consider reducing their own waste and becoming effective in recycling. For sustainability, the precondition for the creation of environmental sensitivity and consciousness is the effective and efficient use of resources. This study analyzes environmental sensitivity and green consumption attitudes and behaviours of 400 families in the city of Muğla in terms of their water and energy use behaviours and approach to household waste. The family is an active unit of consumption in the use of resources. The data is collected through surveys and analyzed by various statistical techniques.

OP-501

**Numerical Analysis and Prediction of the Drag Reduction Efficacy of Microbubble Aided Rigid and Flexible Polymer Solutions in Turbulent Pipe Flow**

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Numerical analysis of the turbulent fluid flow in a pipe has been studied with microbubble injection into dilute solution of flexible and rigid polymers. This was compared with the experimental investigation with good agreement and these results were used to predict the flow in the pipe and behavior of other flow systems. The experimental investigation was carried out with the fluid supplied through the duct at velocity 5 m/s, 10 m/s, 15 m/s, 20 m/s, 25 m/s at corresponding Reynolds numbers of  $4.09 \times 10^4$ ,  $8.18 \times 10^4$ ,  $12.26 \times 10^4$ ,  $16.34 \times 10^4$  and  $20.44 \times 10^4$  respectively. The present work investigates the effects of concentration, velocity distribution, bubble size, friction factor and injection method of these agents in the symmetric of the flow field at different flow rates and the pressure drop obtained at each points on the microbubble alone, and in combined form was noted. Drag reduction effects of microbubble injection into turbulent layer which have been initially proven less than that of polymeric additives was re-visited. It was observed that, there is a synergic effect that occurs in this combination which changes the fluid chemistry.

OP-503

**New Design of an Active Laser Vision Based Control System for Intelligent Robotic Welding System**

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The use of Active Laser Vision (ALV) technology in automated robotic welding has proven to be the most effective means of finding, tracking and profiling welding seams, due to its non-invasive means and accurate results. The technology development in CMOS camera modules to achieve higher resolution and fast data transfer with relatively low cost leads to continual development in ALV system with better accuracy and more reliability. However, still to design an ALV based control for robotic welding, special attention has to be paid to the factors that may affect the accuracy of the system. Factors such as, welding environmental conditions like smoke and arc lights disturbance, welding material types, structure of the welding seam, nature of the laser, type of optical filters to be used and nature of the imaging sensor need to be examined for any new vision system. In this paper, the design criteria and procedures of a new ALV system is explored. The design parameters selection to confront each of the aforementioned factors are presented and discussed. The new system involves an enhancement strategy of captured images, a proposed segmentation technique and automatically detecting and profiling of the welding initial point, final point, intermediary points and size of the welding seam, in addition to the 3-D locations of the welding lines. The computer algorithm of the detection method after calibration is explained and the effect of different design parameters is examined based on the existing information in the literatures and the carried out experiment results. The new design obtained from this research is part of an on-going research project on building a laser vision system for performing automated adaptive welding that is less expensive than the existing systems in the market without sacrificing the accuracy and will be locally designed and manufactured in Turkey.

OP-504

**Current Status of Skilled Clinical Engineer in Developing Countries**

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With the rapid development of medical technology for the last 30 years the clinical engineering practice was introduced in developed countries. But in developing countries, such as Nepal, Bangladesh, Malaysia and so many, this profession is totally a new concept. The medical equipments in the most developed countries are maintained by the clinical engineers whereas in developing countries like Nepal, Bangladesh and Malaysia are maintained by unskilled professional. A series of publication indicate that a lot of sophisticated modernized costly medical equipments could not be kept in a safe and optimum functional condition through the traditional short-trained electrical/mechanical engineers. This paper explores the importance of clinical engineering practice in developing countries of south Asia and its benefits for healthcare service. In this paper, authors propose a novel method for clinical engineering practice for the developing countries to sustain safe use and economical maintenance. This method will not only increase the clinical engineering practice but also help to get optimum feedback through clinical engineers. It should be noticed here that the different developed countries are producing and introducing clinical engineers in health care technology management in different ways, but those methods seem to not be suitable for the developing countries like Bangladesh based on the country contexts. The proposed method will change the health services top level managers and users of the medical equipments. It is ascertained that the performance of the health care technology will be improved by introducing this professional in the hospitals. This study will be much worthy to produce and introduce clinical engineers in order to improve the existing performance of healthcare services in developing countries like Bangladesh significantly.

OP-505

**Electrochemical Regeneration of Chloride Contaminated NaY Zeolite Wastes from Petroleum Refinery**

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The electrochemical regeneration of NaY zeolites was investigated with the objective of regeneration in an electrochemical cell assembled with a Ti/Pt anode and cathode. The samples were characterized by XRD, XRF, SEM and BET techniques. Zeolites could be regenerated through the electrochemical method in this study. Acidity of tap water as electrolyte has shown the percentage of chloride desorption was 79.2% but regeneration at the acidity of tap water as electrolyte, is not effective in a process. The result of characteristics of zeolite by XRF analysis indicated that the structure of zeolite was changed when used sulfuric acid as pH adjustment of Tap water because the zeolite adsorption the sulfide ion from sulfuric acid solution as pH adjustment of Tap water. This result is consistent with area-volume-pore size of zeolite by BET analysis pointed that the pore volume of zeolite (acidity of tap water) had pore volume minimum because sulfides blocked pore size of zeolites. So, with tap alkaline water as a supporting electrolyte, the percentage of chloride desorption was more than 71%. The surface area and pore volume are increased more than the NaY zeolite wastes. The structure of NaY zeolite wastes regenerated by electrochemical with the tap alkaline water as electrolyte is most likely pure zeolite when use XRD analysis. Tap alkaline water use NaOH as chemical used for pH adjustment. It is consistent the addition of positive charge on structure of NaY zeolite which depend on the amounts of Na<sup>+</sup> (NaOH) species. It could be reused in the chloride removal process, saving both resources and the chemical reagent. Therefore, it can be concluded that tap alkaline water is the best choice for chloride desorption and the NaY zeolite wastes can be reused again.

OP-506

**The Transport of Radical Species to Single and Double Strand Breaks in The Liver's DNA Molecule by a Hybrid Method of Type Monte Carlo-Diffusion Equation**

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The therapeutic utility of certain Auger emitters such as iodine-125 depends on their position within the cell nucleus. Or diagnostically, and to maintain as low as possible cell damage, it is preferable to have radionuclide localized outside the cell or at least the core. One solution to this problem is to consider markers capable of conveying anticancer drugs to the tumor site regardless of their location within the human body. The objective of this study is to simulate the impact of a complex such as bleomycin on single and double strand breaks in the DNA molecule. Indeed, this simulation consists of the following transactions:

- Construction of BLM-Fe-DNA complex.
- Simulation of the electron's transport from the metastable state excitation of Fe 57 by the Monte Carlo method.
- Treatment of chemical reactions in the considered environment by the diffusion equation.

For physical, physico-chemical and finally chemical steps, the geometry of the complex is considered as a sphere of 50 nm centered on the binding site, and the mathematical method used is called step by step based on Monte Carlo codes.

OP-507

**Nondestructive Measurement of Hardness In Welded Carbon Steels Using Ultrasonic Wave Velocity**

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The Ultrasonic Contact Impedance (UCI) hardness test method is widely used for non-destructive hardness measurement which converts ultrasonic vibration frequency shifts into hardness. However, this method is restricted with surface hardness measurement. In this study, a novel technique is developed to determine through thickness average hardness using longitudinal ultrasonic sound waves. For this purpose, samples of ultra-low carbon interstitial free (IF) steel are prepared and annealed at varying temperatures. Immersion ultrasonic technique is used to measure ultrasonic wave velocity in each sample. Rockwell B scale hardness of annealed samples, which are assumed to be isotropic, are determined and correlated with ultrasonic wave velocity shifts. Predictions of new technique are verified with destructive hardness measurement results.

OP-508

**A Wide and Flat-Gain of an Amplifier by Using Zirconia-Based Erbium-Doped Fiber (Zr-EDF) for Single Pass Operation**

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An amplification for single pass operation was demonstrated by using Zirconia-based erbium-doped fiber (Zr-EDF). 1 m is the optimum length of fiber due to the highest gain at 1555 nm wavelength of 28.62 dB when the input signal was fixed at -30 dBm. At input signal -10 dBm, a wide and flat-gain from 1530 nm to 1570 nm region was obtained. The average gain value was 19.36 dB with a very small variation gain of 0.27 dB. Meanwhile the noise figure for both input signals were maintained below than 12 dBm for the specific regions.

OP-509

**Characterization of Solid Char Derived from Effect of Radiation Time Study on Microwave Assisted Pyrolysis of Kitchen Waste**

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Increment of population in a country influence to the generation of solid waste been sent to the landfill. High proportions of solid waste contribute by the kitchen waste. Currently, conventional methods for final disposal of these wastes by using landfill or through direct incineration. However, high moisture content at 90% give dilemma for both disposal method which leachate was generated from the landfill and furthermore, it cannot be achieved or limited by using incineration due to the humidity limitation of the incinerator. In this research, microwave assisted pyrolysis was introduced not only to dispose, at the same time recovering valuable material from the kitchen waste. Effect of radiation time was studied at range 10 min to 60 min. Meanwhile, parameter like microwave power level, sample mass loading and microwave absorber mixing ratio at 1000W, 200g, and 20%wt/wt respectively. Solid char obtained from the experiment were identified and analyzed. Bomb calorimeter is used to determine the energy content in the sample. The optimum condition for the energy content within the sample is achieved at 18689J/g. FTIR was used to identify the hydrocarbon compound in the solid char. In order to determine the inorganic metal, XRF was used. Elemental analyzer was used to identify the carbon, hydrogen, nitrogen, sulfur and oxygen content in the solid char. In a nutshell, the microwave assisted pyrolysis can be implemented to treat the kitchen waste and at the same time can recover the valuable material which has the potential to become solid fuel.

OP-510

**Effect of Mass Loading and Microwave Absorber Application Method on the Yields of Product from Microwave Assisted Pyrolysis of Palm Oil Mill Effluent**

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Nowadays, palm oil mill effluent (POME) is abundantly discharged by palm oil mill into environment without being treated first. Approximately, about 50 million tons of POME is produced every year. The disposal of POME to open water such as river will cause some negative impact to environment. In addition, POME that been produced cannot be sent to disposal company due to the high production of POME. Therefore, in-situ treatment needs to be developed. The current disposal method implement by palm oil industries is biodegradable method. This method is applied due to high water content in POME which is by 90% of water. Hence, by using improvise microwave-assisted pyrolysis (MAP), POME can be disposed and recovered as solid char and liquid oil. In this paper, the effects of mass loading of POME at range 100 to 500 grams with additional homogeneously of activated carbon (AC) have been studied. Microwave power level, radiation time and mixing ratio of AC were set constant at 1000W, 30 minutes and 5% respectively. Solid char and liquid oil obtained were identified and analyzed. FTIR was used to identify the hydrocarbon compound within solid and liquid product. Energy

content of solid char was identified by using bomb calorimeter at 23MJ/kg and CHNSO content have been analyzed by using elemental analyzer. Meanwhile, chemical compound in liquid oil were identified by using GCMS. In a nutshell, it is possible to dispose POME with high moisture content by using microwave assisted pyrolysis and it is an alternative technique which cannot be achieved by current technique. At the same time, this technique can recover valuable chemical and produces solid char which has potential as solid fuel.

**OP-511**

**Preparation of Sodium Aluminate from Spent Alumina from Petrochemical Industry**

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In this research, spent alumina from the petrochemical industry is used to absorb moisture from the air in laboratories. Nowadays, spent alumina increased, especially from petrochemical industry which occurred about 37.5 tons / year. The most entrepreneurs didn't seriously intend about the spent alumina management because the desiccant alumina with low price made the amount of spent alumina disposal increased. An alternative environmental management method of spent alumina is used to be the starting raw material for preparation of sodium aluminate. The aim of this research is to determine the optimum conditions for preparation sodium aluminate from spent alumina from petrochemical industry. Sodium aluminate was prepared by the dissolution of spent alumina in a sodium hydroxide. The amount of spent alumina and the concentration of sodium hydroxide were adjusted to the mole ratio of sodium oxide and alumina ( $\text{Na}_2\text{O} : \text{Al}_2\text{O}_3$ ). Mixing of spent alumina and sodium hydroxide was heated at 60 °C and stirred at 200 rpm for 30 minutes. The crystallization, chemical compositions and morphology of sodium aluminate were analyzed by X-Ray Diffraction (XRD) method, X-Ray Fluorescence (XRF) method and Scanning Electron Microscopy (SEM) method respectively. The results showed that the optimum concentration of sodium hydroxide was 6M. The mole ratio of  $\text{Na}_2\text{O} : \text{Al}_2\text{O}_3$  as 2:0.25, 2:0.75 and 2:0.9 has the XRD spectra similar to sodium aluminate standard graph and no interruption from spent alumina. The ratio 2:0.75 has the highest percentage of sodium aluminate crystal (93.62%). The structure of ratio 2:0.75 mostly consisted of orthorhombic crystals and the XRF data which are approximately similar to the sodium aluminate standard. Then, the optimum condition showed that 6M of sodium hydroxide activated with the mole ratio of  $\text{Na}_2\text{O} : \text{Al}_2\text{O}_3$  was 2:0.75 as the best condition for preparation of sodium aluminate from spent alumina from petrochemical industry.

**OP-512**

**An Evaluation of Integrated Gas Engine and A Thermal Storage System for Residential Applications**

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In response to climate change and global warming and due to the depletion of fossil fuel several strategies can be adopted in order to achieve significant reductions in CO<sub>2</sub> emissions and save energy. One of these strategies is to combined heat and power (CHP) technologies in residential sector, especially micro combined heat and power ( $\mu$ CHP) technology which can produce less than 10 kW of electricity. One of the most appropriate candidate for  $\mu$ CHP application is a gas engine, which is an internal combustion engine (ICE) operates by natural gas. A gas engine based  $\mu$ CHP system has several advantages compared to other available technologies since it is a robust technology. Consequently, the potential of technology to be applied in the residential energy systems, especially for a single dwelling, has been investigated in this research. An overall model of an integrated ICE based  $\mu$ CHP and a thermal storage system, has been developed. This model is capable to simulate the flow of thermal and electrical energy within the system. In addition, this model is able to estimate the emissions and operational costs of the system for any period

of time. Different sizes of  $\mu$ CHP prime mover have been investigated. Results show that such a  $\mu$ CHP system can considerably reduce the cost of operation as well as CO<sub>2</sub> emissions of a single dwelling. Moreover, it is noticed that optimally sizing the  $\mu$ CHP unit and optimally managing the energy flow within the system are of great importance.

**OP-513**

**Seismic Performance of Mid-Rise and High-Rise Steel Moment Resistance Frames Subjected to Near and Far Field Strong Motions Using ASCE Scaling Method**

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Some of the most famous recent earthquakes have provided evidence that ground motions in the near field of a rupturing fault differ from ordinary ground motions, as they can contain a large energy, or "directivity" pulse. Considerable damage was occurred during an earthquake by this pulse, especially to structures with natural periods close to those of the pulse. Failures of modern engineered structures observed within the near-fault region in recent earthquakes have revealed the vulnerability of existing Steel Moment Resistance Frames (SMRFs) against pulse-type ground motions. This may be due to the fact that these modern structures had been designed primarily using the design spectra of available standards, which have been developed using stochastic processes with relatively long duration that characterizes more distant ground motions. With this introduction the propose of this paper is to evaluate the performance assessment of mid-rise and high-rise SMRFs under near field strong ground motions. So a number of 8, 12 and 16-story, 2-D structural frames being designed using the strength method, are considered. A set of 7 near-field and 7 far-filed earthquake records, scaled according to ASCE-7(05), are considered for nonlinear dynamic time history analyses using SAP2000 program. Maximum values of inter-story drifts, displacement and energy dissipations are determined to be used in the performance assessment process. It is clearly seen that there is more seismic demand on this three parameters when the SMRFs is subjected to near-field ground motion.

**OP-514**

**Investigation of Laser Jet in Liquid Stream**

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Laser micro machining technology is used to fabricate micro-structures of different materials such as metals, plastics, glasses and ceramics. However, conventional laser jet has a limited working distance and creates heat affected zone on cutting surface causing damages such as micro-cracks, oxidation and structural changes. Contamination and deposition are also issues as the ablated material on the work piece surface. These issues orient the researchers to find for alternative way of laser technology. In this study, a revolutionary cutting technology called as the liquid streamed laser technology was investigated. The benefits of this technology are particularly valuable for very narrow kerf cutting, delicate surface treatments and high-precision processing of thin work pieces sensitive to deformation and heat. Within this work, it is realized that laser jet can be guided by liquid stream by permitting production of parallel high aspect ratio cut kerfs. No focusing or distance control is required. The water jet cools the cut area eliminating any heat effects, while removing the ablated material from the cut and avoiding contamination. All effecting factors such as water pressure, working distance, cutting depth, laser power were investigated in detail.

OP-515

**Investigation of the Effect of Axial and Rotational Velocities on the Flow Dynamics of a Rotating Shaft Cavity**

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In this study, cavity problem, a commonly seen problem in engineering applications, is investigated numerically. For the modelling of the problem, the flow is considered as 3-D, unsteady, turbulent and incompressible. The basic cavity problem is modelling also taking the axial, rotational and lid velocities into account in order to model more complex cavity problem. The lid-driven cavity problem on a rotating shaft is examined numerically via a commercial fluid mechanics software solving RANS equations based on finite volume method (FVM). Well known k-ε turbulence model is chosen for modelling turbulence precisely. It is aimed to investigate the effect of different axial and rotational velocities on the fluid dynamics. In order to do this, for a constant lid velocity, three different axial and rotational velocities are analyzed which means nine cases to be investigated. As a conclusion, velocity contours and velocity profiles are gathered in two sections of the geometry in order to make a discussion.

OP-516

**CFD Analysis of the Effect of Ship Form on Sewage Disposal**

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Cruising has an increasing importance in recent years. Increasing in ship and voyage number results with more environmental problems. Cruise ships have a remarkable passenger carrying capacity. Thus, every cruise ship has a great potential of producing wastewater, daily. In spite of recent comprehensive studies, the impacts of wastewater are not well understood. Determining the impacts strongly depends on certain data about wastewater. The characteristics of receiving environment during and after discharge must be also considered carefully. In dilution factor calculation, the ship is accepted as a floating cross sectional area that is formed by breadth and draught. Dilution factor is used to understand the dispersion of the wastewater in the sea after discharging. It is identified depending upon the ship's speed, draught, breadth and discharging rate. It is formulated as follow:

Dilution factor = (ship beam x ship draft x ship speed) / (discharge rate).

The aim of this study is to estimate the dilution factor by computational fluid dynamics (CFD) analysis. Thus, a floating barge is modelled and wake zone and waste dispersion are investigated. The results are compared with the dilution estimations in the literature. The wastewater dilution factor of the barges is calculated by using various breadth, speed, draught and discharging rates. These values are compared with each other and the values gathered by empirical formulas.

OP-518

**Turbulent Taylor-Couette-Poiseuille Flow with Stepped Rotating Inner Rod**

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Turbulent flow between two coaxial cylinders, one of which is rotating, is called Taylor-Couette-Poiseuille flow. This kind of flow with stepped inner rod is widely used in engineering applications such as journal bearings, rotor-stator systems, turbo machinery. Both rotation of the inner cylinder and separation-reattachment behavior of the fluid due to the sudden expansion at step change strongly affect the characteristics of the flow zone. In this study, Taylor-Couette-Poiseuille flow with backward-facing step at rotating inner cylinder is investigated numerically via finite volume method. RANS equation solver code is employed to model turbulence precisely. Obtained results are reported

for velocity distributions, reattachment points and pressure drops for both rotating and non-rotating cases.

OP-519

**Attitudes of Firms in Adana Organized Industrial Zone Towards Innovation**

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This study applies a survey to the firms operating in Adana Organized Industrial Zone (AOSB) to figure out their attitudes towards innovation. First of all, a random sample of size at least 50 is selected out of 330 firms in AOSB. A set of 12 criteria which were found to be effective on a firm's innovation is determined upon a literature review. (Annual R&D Budget, Number of Employees that work in R&D Department, Patent Numbers, Number of Registered Trademark, Export, Number of Employees that have higher education, Annual Education hours in the institution, Level of Information Technologies, System's Certificates such as ISO9000, Number of Projects supported by TUBİTAK, KOSGEB, ÇKA, SANTEZ, Annual number of occupational fairs that the firm attends, Level of Manufacturing Technologies). The firms in the sample is asked to rank these factors in terms of their importance. Furthermore, the firms are enabled to enter other criteria which are not listed in the survey but found to be important by the firms in the ranking. The statistical analysis is performed to point out the firms' attitudes towards innovation.

OP-520

**The Impact of ISO 9000 Implementation on Profitability**

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ISO 9000 is a quality standard series issued by the International Organisation for Standardization (ISO) in 1987. This series contains rules and regulations for establishment a quality system within a company. It gives useful guidelines for the companies to implement a quality system because it covers most aspects of the quality system. Once the company implement the ISO 9000, it will be certified to the ISO 9000 standard (ISO 9000 Certification). This certification could be gained through a third party organisation which audits the system and issues the certification. This certification will be stamped on products and could be involved in the advertisements to give good impression about the company. Furthermore, this certification is considered as a badge for certified company. So, ISO 9000 gives an indication that this company produces high quality products or introduces high quality services. Several companies around the world, both manufacturing and services companies, have been certified to ISO 9000 since 1987. However, it appears that the ISO 9000 Certification has become a necessity due to globalization since most people as well as other companies around the world believe in this certification as an indication for high quality products and services. This paper focuses on the effects of ISO 9000 Certification on profitability according to the previous studies in this field. The profitability of ISO 9000 Certification has been investigated according to the research review. By the end, Important conclusions have been drawn from this research.

OP-521

**Innovation Practices at ENSACAR S.A.: Changing from a Polypropylene Packaging Products Manufacturer to a Logistic Solutions Consulting Group**

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This paper is a result of innovation practices made to a manufacturer and commercializer of polypropylene packaging products, ENSACAR S.A., an



important business nationwide that recently suffered an economic crisis in our country, given that one of their principal clients shut down their manufacturing facilities leaving ENSACAR without this important income. Innovation, thus shifted from the incremental innovation to a radical innovation, where the core business model had to change, resulting in new opportunities to make this business not just a manufacturer, but as a generator of logistic solutions through their packaging systems, combining their experience in packaging technologies with their innovation background. Results of this breakthrough in innovation is presented, highlighting the importance that these solutions give to real logistic challenges our region is facing in the present time, as a business confronts its crisis through innovation without leaving behind the contributions made to the community.

OP-522

**A New Mathematical Model for Hierarchical Chinese Postman Problem**

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The Hierarchical Chinese Postman Problem (HCPP) is a variant of the classical Chinese Postman Problem, in which the arcs are partitioned into clusters and a precedence relation is defined on clusters. Practical applications of the HCPP include snow and ice control on the roads and determination of optimal torch paths in flame cutting. The HCPP is NP-hard in general, but polynomial-time solvable if the precedence relation is linear and each cluster is connected. In this paper, for solving this problem, a new linear mathematical model, requiring a lower computational effort and its solution is presented.

OP-523

**Innovative Treatment Methods in Medicine: Treatment of Typhoid Fever in Children**

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**Objective:** To compare the clinical efficacy of ciprofloxacin vs ceftriaxone in terms of the proportion of children becoming afebrile in 96 hours.  
**Study Design and Duration of Study:** Randomized controlled design study. The study was conducted at the Department of Pediatrics, Holy Family Hospital, Rawalpindi from March 2010 to September 2010.  
**Methodology:** 88 children who fulfilled the clinical criteria of having Typhoid fever were included in the study, who were coming to the indoor and outdoor of the department. 44 patients were treated with injectable ciprofloxacin and 44 were treated with injectable ceftriaxone.  
**Results:** The study included 88 patients with febrile illness suspected of having typhoid fever. The mean age was 8.3±1.94 years and 41 (46.6%) were males. The mean weight was 24.7±6.3 kg. Only 15 (17%) used boiled water as a routine. 68 (77.3%) children in total became afebrile within 96 hours and 20 (22.7%) failed to become afebrile in 96 hours. In the ciprofloxacin group 25 (56.8%) patients became afebrile in 96 hours and 19 (43.1%) failed to become afebrile in 96 hours. In the ceftriaxone group 43 (97.7%) patients became afebrile in 96 hours and 1 (2.3%) failed to become afebrile in 96 hours. The proportion of patients becoming afebrile within 96 hours was significantly higher in the ceftriaxone group as compared to ciprofloxacin group; p= 0.00.  
**Conclusion:** Ceftriaxone is more effective in children with typhoid fever in terms of greater proportion of children becoming afebrile in 96 hours.

OP-524

**The Potential Applications of *Vitreoscilla* Hemoglobin for Bioethanol Production from Sugar Industry Wastes**

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Expression of *Vitreoscilla* Hemoglobin (VHb) in ethanologenic strain FBR5 enhanced ethanol production in corn fibre hydrolysate and potato waste water have been shown previously. In this work, the enhancement of bioethanol production with expression of VHb was investigated by using sugar beet molasses hydrolysate (SBMH) included media as carbon source. In this study, ethanologenic *E. coli* strain FBR5 and FBR5 transformed with the VHb gene in two constructs (strains TS3 and TS4) were utilized. In SBMH medium both strains TS3 and TS4 produced significantly more ethanol than strain FBR5. Moreover, in SBMH medium VHb expression increased the ratio of ethanol concentration to cell biomass as much as 164% for TS4 compared with strain FBR5. The results demonstrate that VHb technology can have potential approach in the production of ethanol from different food processing wastes such as sugar beet molasses.

OP-525

**The Control of Biofilm Formation of *Staphylococcus aureus* Strains Isolated From Raw Milk Samples**

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Microbial adhesion to surfaces and the consequent biofilm formation on dairy industry equipment can lead to serious hygiene problems and economic losses. Inhibition or removal of biofilm usually requires the use of chemical compounds such as chlorine. Though efficacious, corrosion, product contamination, and toxicity limit the use of these compounds. Therefore, the use of natural antimicrobial agents such as organic acids can be effective alternative for the control of biofilms. In this study, the control of biofilm formation of *Staphylococcus aureus* strains by citric acid treatment for comparison with chlorine treatment was investigated in microtitration plates. Prevention and the removal rates of biofilm formation by citric acid treatment were found to be higher than chlorine treatment. The results from this work shows that "natural antimicrobials" could be used for the control of biofilm formation in dairy industry.

OP-526

**Applying Silver Nanoparticles to Ensure the Safety of Food Production Processes**

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Nowadays bacterial contamination of production processes remains a significant problem for the food industry. The issue is especially urgent for the technologies involving fungal microorganisms cultivation. The most widespread method of preventing the bacterial infections - the use of antibiotics - has a number of drawbacks. The most noticeable downside is the ability of bacteria to develop antibiotic resistance. The use of silver nanoparticles (SNP) seems to be an alternative way to ensure the safety of food technologies. SNP demonstrate selective antimicrobial action against multiple bacterial species while not affecting fungal species. Moreover, it has never been reported, that any bacteria are able to develop resistance against nanoparticles. In our research, we used SNP colloidal stabilized with Gum arabic. The size of nanoparticles was 10-15 nm. There are numerous technologies utilizing fungi of *Trichocomaceae* family. Production of many alcoholic beverages is based on *Aspergillus oryzae*, while *Aspergillus niger* is involved in preparation of gluconic acid and citric acid. We conducted the tests for both species by cultivating them on different media contaminated with bacteria *Escherichia coli*, *Bacillus subtilis*,

*Pseudomonas fluoresces*, and *Sarcina flava*. Samples were treated with SNP solutions of various concentrations. The results show that nanoparticles inhibit the growth of bacteria within the concentration of 0.03 g/dm<sup>3</sup> in solid media. The specified concentrations did not affect the growth of fungi. Most of the brewing technologies require the use of *Saccharomyces cerevisiae* yeasts. This species is extremely vulnerable to bacterial infections. In our experiments, we cultivated brewer's yeasts in liquid media contaminated with *Micrococcus varians*, *Bacillus cereus*, *Erwinia herbicola*, and *Pediococcus clausenii*. Our tests indicated that SNP inhibited the growth of listed bacteria within the concentration of 0.005 g/dm<sup>3</sup>, while yeasts were not affected. Current research was made under the grant of President of Russian Federation MK-5220.2014.4

OP-527

**Bioethanol Production from Cheese Whey by *Escherichia coli* Expressing *Vitreoscilla* Hemoglobin**

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Cheese whey is produced as a food processing waste in large quantities and represents a potent pollutant when it is discharged without any treatment. In this study, the production of bioethanol from cheese whey by *Vitreoscilla* hemoglobin (VHb) expressing ethanologic *E. coli* strain FBR5 was investigated. Vgb (*Vitreoscilla* hemoglobin gene) carrying transformants of strain FBR5 (TS3 and TS4) were evaluated for their growth, ethanol production and VHb expression in cheese whey containing culture medium (CWM) under both high aeration and low high aeration conditions. In CWM, VHb expression increased the ratio of ethanol concentration to cell biomass for vgb expressing strains by up to 160% compared with strain FBR5. The results extend the list of waste products from which ethanol production may be enhanced by using VHb-expressing microorganisms.

OP-528

**Antiphytopathogenic and Antimicrobial Activity of Streptochlorin from Marine-Derived *Streptomyces* sp. 9CM17**

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Antiphytopathogenic and antimicrobial agent, streptochlorin, was isolated from marine derived Actinobacteria (9CM17). The strain that isoleting from estuarine sediment collected from Aegean Sea, Aydın (37°57'19.95"N and 27°15'36.68"E) and R2A medium (with %50 See water) was used as an isolation medium. 16S rRNA gene sequence analysis showed that the strain belongs to the genus *Streptomyces*. A fermentation study in R2A broth medium (with %50 see water- 30L) followed by extraction with EtOAc afforded 607mg of crude extract. A bioactivity-guided fractionation by using Vacuum Liquid, Open Column, Size-Exclusion chromatography on silica gel, reversed phase C-18 and Sephadex LH-20 stationary phases led to the isolation of two secondary metabolites (9CM17-01, 13.5 mg; 9CM17-02, 2.5 mg). Structures of the metabolites were established as 4-chloro-5-(1H-indol-3-yl)oxazole and 5-(1H-indol-3-yl)oxazole, respectively, by means of NMR (1H, 13C, COSY and COSY, HMQC, HMBC) and MS spectral data. Antimicrobial activity of 9CM17-01 (streptochlorin) and 9CM17-02, were tested by microdilution method against enteropathogenic *Escherichia coli* 0157:H7 (RSKK 234), methicillin resistant *Staphylococcus aureus* ATCC 43300, vancomycin resistant *Enterococcus faecium* DSMZ 13590, *Candida albicans* DSMZ 5817 and *Pseudomonas aeruginosa* ATCC 27853. Streptochlorin was only found active against *Candida albicans* with 8 µg/ml MIC value. Also antifungal activity of the streptochlorin and 9CM17-02 were tested against to two important phytopathogens (*Fusarium oxysporum* and *Rhizoctonia solani*) due to its structural similarity with antifungal agents (indole derivatives) produced by plants. Finally, 2 µg/ml and 1 µg/ml MIC values were observed against *Fusarium*

oxysporum and *Rhizoctonia solani*, respectively. As a results of tests detected no activity for 9CM17-02. Antiphytopathogenic activity of the streptochlorin was reported for the first time.

OP-529

**Performance Analysis Based on Fuzzy Logic in Healthcare Systems and its Application**

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This study guides hospitals in the health system which is one of service systems on performance analysis. The study puts forward an analysis approach which can be used for all hospitals and even all subsystems of service system by having benefited from the experiences of process improving engineers and the applications in USA. In the beginning of the thesis, after giving information about service system, classical performance measurement models and health system, the application process is studied. The hospital performance analysis of the study consists of three application. The first application stage is the examination of the process analysis of hospitals based on the patient. In the second application stage it is analyzed which determine the relationships between the indicators which account for the performance of hospitals. Especially in this stage, the relationships between the criteria and subcriteria of each indicator has been determined mathematically by using Fuzzy Analytical Network Process, which is a fuzzy decision making technique and DEMATEL. The reason why artificial intelligence technologies are used here is that this approach has advantages while it keeps in step with hospitals and hospital staff and a new situation successfully and fast, uses its reasoning skill by increasing the number of alternatives examined in the solution of a problem and understands and uses the knowledge right. This application stage mentioned here consists of very labor intensive computation steps. For this reason the calculation algorithm is converted into software language for an efficient analysis. This software can be used not only for hospitals but the other subsystems of service system. In the third stage, there has been developed a mathematical model based on the interactions and performance indicators determined in the second stage. As a result there has been developed a mathematical model which analyses the performance of the hospital.

OP-530

**Strengthening and Repair Methods in Iraq for Reinforced Concrete Beams**

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Shear or flexural failure, or both, may occur in reinforced concrete beams due to blast loading. In this study, the existing methodologies explaining how to repair damaged structural elements, using locally available materials in Iraq, will be presented through analytical design calculations and finite element methods. Currently, fiber-reinforced polymer (FRP) composite materials are commonly used across Iraq for the rehabilitation and repair of damaged structural elements. The applications of these available materials, along with their strengthening methodologies, will be investigated, specifically for damaged RC beams under blast loadings. In the analytical phase of this study, a total of nine RC beams, with and without FRPs, will be studied. The effectiveness of FRPs with different configurations will be investigated by utilizing the existing methodologies outlined in the ACI-318 and ACI-440. These nine RC beams will also be modeled using ANSYS software in order to compare the results from the analytical equations to those from the FE models. A Visual Basic program, developed to help local engineers in Iraq determine the best FRP strengthening procedure (by allowing them to calculate the beam capacity, with and without FRPs, in both shear and flexure before and after blast damage) will also be discussed. In the application phase of this study, several buildings located in Baghdad that experienced severe blast damage will be analyzed in order to express the reasoning behind the current strengthening procedures for RC beams in Iraq. A critique of the strengthening procedures will also be provided in this study.

OP-531

**Hydrolyzed of Electrostatic Powder Coating Wastes and Using Them as Filling Material in Polyethylene**

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In this study, a new product has been developed by hydrolyzing the electrostatic powder coating waste material with water and alcohol and this product has been used as filling material in polyethylene. The adhesion feature of powder coating waste to metal surfaces has been completely eliminated at high temperatures (120 °C - 180 °C) through hydrolyzation. Thus, powder coating waste has been made available for systems which require high temperature such as plastic injection and extrusion machines. Hydrolyzed waste has been mixed homogenously in extruder at temperatures between 140 °C and 160 °C as filling material up to 30% of weight with polyethylene which has linear low density and it then has been made granule again by being broken. Tensile specimen were produced by the obtained granules being poured into plastic injection machine and by pressing onto standard tensile test specimen molds between temperatures of 170 °C and 200 °C. Thereafter, the changes in properties of polyethylene according to amount of hydrolyze powder coating waste in the mixture has been determined by analyzing these samples in terms of their mechanical properties, density, water absorption capacity and changes in viscosity. Thus, through imparting electrostatic powder coating waste which is formed worldwide yearly about 300000 tons and is not used to the industry through recycling, the energy cost for transportation, saving and combustion of the waste material disappeared. This study also serves as an eco-friendly purpose since it ensures the elimination of the damage to the environment during storage and combustion of waste materials.

OP-532

**Comparison of Photovoltaic Inverter Performance in Different Climatic Conditions**

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Photovoltaic (PV) inverter is one of the most important component in a solar PV system. However, since that most of the solar producer are based in Europe and in the US the datasheet only indicates how it will performs in the respective producers country. As businesses that relates to PV are growing rapidly in the tropical climate in the past decades this paper hence aims to compare the performance of a Photovoltaic Inverter in 2 different climates; that are California in the US (temperate climate) and Melaka in Malaysia (tropical climate). To do so a one day averaged of one month high quality data of irradiance and temperature from the two aforementioned places are collected in csv/excel form. These data are then turned into a script and run in a Photovoltaic Array Simulator (PVAS) which act as PV module and also connected to the designated PV inverter. This connection resembles a complete solar photovoltaic system. The output of this system in terms of electrical properties are collected by a dedicated Energy Analyzer that acts as a data logger as well as monitoring system. The analyzed results showed a significant difference in terms of conversion efficiency confirming to the hypothesis that PV inverter performs with different efficiency in different climatic conditions.

OP-533

**Chitosan-Methylcellulose Hybrid as a Moist Skin Regeneration Matrix**

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In this research, methylcellulose which is commonly used in contact lens and artificial tears was mixed with chitosan. This approach is intended to enhance the ability of porous chitosan scaffold as a skin regeneration matrix in retaining water to assist new cell regeneration along the wound healing process. Pure chitosan and variants with 10%, 20% and 30% of methylcellulose solutions were fabricated into porous matrix via freeze drying process. Investigation using Fourier Transformed Infrared Spectroscopy (FT-IR) showed no appearance of new functional group, proving that only physical mixing interaction occurred between chitosan and methylcellulose. Morphology study via scanning electron microscope (SEM) depicted interconnecting pores within the matrix, providing spaces for new cell migration. The dimension of major pores are around 100-200µm, giving enough room space for new cell attachment. Interestingly, water uptake study showed negligible effect on the addition of methylcellulose towards chitosan. However, dehydration test proved that methylcellulose has prolonged the water retention time up to 7 days compared to pure chitosan matrix. In vitro enzymatic biodegradation study results showed the potential of this hybrid porous matrix as a self-degraded skin regeneration template. This is supported with in vitro cell studies using L929 mouse fibroblasts that showed promising cell viability after treatment with this hybrid matrix.

OP-534

**An Innovation in the Administration of Oral Medication to Children: The Oral Medicine Dispenser**

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In our country, children in hospitals are being administered drugs orally by removing needles from syringes. This practice results in clinical errors and wastes supplies. Moreover, it has been found that the oral medications prescribed to pediatric patients cannot be administered in the required dosages by mothers at home. Studies in the international literature confirm these observations; however, there are no studies on this issue in Turkey. For this reason, an investigation of this issue was conducted and found that nurses have problems with both the preparation and the administration of medications. Therefore the author developed an oral medicine dispenser for clinical use by nurses and domestic use by parents. This product prevents errors in administration that result from the use of IM (intramuscular) or IV (intravenous) syringes since this product is visually different from a syringe. It prevents the incorrect dosages resulting from the use of the spoons and similar tools at home since spoons and apparatus provided with the liquid medication on the market are not appropriate for usage. It prevents confusion resulting from the white color of IM and IV syringes by making the entire product monochromatic, and it prevents the traumas, accidents and poisonings caused by the hard structure of the head caps of products since this oral medicine dispenser has a silicone cap. This product has a Certificate of Registration of Design. The "Oral Medicine Dispenser's" application for industrial design was made by the Hacettepe Technology Transfer Center (HT-TTM) Patent Office. This project was supported by the Hacettepe University Scientific Research Projects Coordination Unit. Project Number: "013D01403001" and won the A' Design Award and Competition in Italy.

OP-535

**Complexity Optimization**

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As a consequence of the competition which automotive sector has created, complexity has become a strategical matter for the sector. The manufacturers aim to maximize the customer service level, while minimizing the costs. Therefore, they not only try to manufacture automobiles with reasonable prices within such a competitive environment, but also to provide with the variability to make the customers feel as if their automobile is a tailor-made for them. The manufacturers outmaneuver at the market with creating product complexity; however complexity increases the costs. This study's purpose is to create a calculation method to understand the effect of complexity increase for a company and to make a suggestion that compares complexity with sales increase by considering variables such as manufactures, after sales progresses, stocks, working places, operations, emergency transportation, idle materials and R&D costs, in the frame of Supply Chain.

OP-536

**Aging Effect of Sol-Gel Solution on Characteristic Properties of ZnO:Al Nanowires**

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ZnO nanowire arrays have been synthesized by chemical bath deposition on sol-gel derived Aluminium doped Zinc oxide (ZnO:Al) thin films. Aging effect of sol-gel solution on structural, optical and electrical properties were investigated. For this purpose, nanowires were grown on seed layers which produced from as received and aged solution for one week via chemical bath deposition technique. Solution concentration were kept at 0,5 M for sol gel solution, (dopant concentration were set at % 1 at. ) and 0,025 M for chemical bath solution (Zinc Acetate and Zinc nitrate solution were utilized). The morphology and crystal structure of nanowires have been characterized by scanning electron microscopy (SEM) and X-ray diffraction (XRD) respectively. The changes in optical and electrical properties of thin film samples produced by the aged solution have been investigated with the rise of the elapsed time at the aging process. The changes in electrical resistivity on the surface were measured with a four pin probe. Our reproducible experimental results show that aging of sol-gel solution has a significant effect on ZnO:Al nanowire arrays properties.

OP-537

**Characterization and Corrosion Behavior of (Fe<sub>65</sub>Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub> Nanostructure Alloys Obtained by Mechanical Alloying**

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This work is devoted to understanding the mechanisms of formation of nanostructure alloys (Fe<sub>65</sub>Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub>, to define the rules for optimized development for obtaining nanostructured alloys based on iron by mechanical alloying process.

Interest of Fe<sub>65</sub>Co<sub>35</sub> system improved the electrical properties and protection against corrosion of compound Fe<sub>65</sub>Co<sub>35</sub> required the addition of aluminum. A series of Nanocrystalline (Fe<sub>65</sub>Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub> samples have been prepared, these structures are prepared using mechanical alloying based on planetary ball mill under several milling conditions. Mechanical alloying is a non-equilibrium process for materials synthesis. The scanning electron microscopy (SEM) was used to characterize the chemical composition of samples surface and the morphology of powder. The structural effects of mechanical alloying of powders were investigated by X-Ray diffraction analysis, magnetic technique VSM and corrosion study. Consequently, alloy powder with an average grain size about of 8 nm was obtained and hardens magnetic properties than (Fe<sub>65</sub>Co<sub>35</sub>).

The polarization and impedance curves of different samples in NaCl media showed the corrosion potential and corrosion resistance values increases with milling time (crystallite size) until 54 hours.

OP-538

**Effectiveness of Educational Leveling Citizen Views of Non-Formal Learning**

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With the development of education in the world in all sectors of this makes any element that is concerned with institutions and schools are always competing to be the best of the others to highlight their competitive advantage in order to compete and get the best graduates.

On the other hand a lot of underprivileged citizens and life in the township that does not have the same access to education and so could not follow the direction of the future of education is now in the global competition, it is in the review of the terms of their inability economy, infrastructure, technology of their day to day and quality of human resources.

By looking at the gap then the system should be changed to non-formal education becomes the main reference in formal compare, because formal education is certainly a high cost if we want to study in the best institutions, but what about those who do not have the material and is unable to pay, so of education there is not a whole are not the same.

So that non-formal education into the real answer they can get anyone any considering the focus on non-formal schools, it is most in need for any developing country to leveling their educational future, if this right is not prevented education gap will be widened not only in education will affect the economy into the world of work.

Changes in this system must be carried to shore up their lives better because every citizen should have equality with others especially in terms of education.

OP-539

**How Consumers and Smart Devices Co-Evolve?: The Case of Korea**

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Information and Communication Technologies (ICT) innovation has enlightened the people to encounter the flood of information. The era of smart technology, spurred by the emergence of the smart devices, has massively changed the public from passive consumer to active creator of product and service. Especially, media consumers not only consume the given media contents, but also create their own contents via omnidirectional features and platforms. Naturally, ICT innovation is driven by both participating actors and those actors coevolve in the ICT environment. Despite the nature of ICT environment, hitherto studies have mainly discussed the innovations by focusing on single actor.

This study aims to identify the interactions and causality in between the trend of consumer preference and the behavior of suppliers. Thus, the authors raise the very question; Does the consumption trends in the media market affects the innovative decision making process of the suppliers? To answer the question, the authors will conduct concurrent analysis of mainstream preferences and the smart devices by time series. Firstly, the mainstream media trends will be analyzed through the network analysis based on the KISDI Media Panel database, the statistics which surveyed the consumer behavior in multi-contents, multi-device and multi-platform environment of cross-media market. At the same time, authors will investigate the specifications of smart devices by corresponding years. The study will show the correlations of not only year-by-year analysis, but causality will be tested through the VAR model in between two variables.

The results of this research will determine the interactions between the supplier and the consumer of smart device based on actual consumption of media products in Korea. Hence, the proposed methodologies and expected results will contribute to extending the research framework in analyzing the product innovation. In the end, the results may allow the prediction of technological innovation in the future.

**OP-540**

**Licensing in a Hotelling Model with Quadratic Transportation Costs**

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This paper studies optimal licensing regimes in a linear Hotelling model where firms are located at the end points of the city and where the transportation cost is not linear but quadratic. We study for that a more general cost function and we try to compare the findings with the results of the linear cost. We find the same optimal licensing regimes. A per unit royalty is optimal when innovation is not drastic and no licensing is better when innovation is drastic. We also find that no licensing is always better than fixed fee licensing.

**OP-541**

**Six Sigma Approach and Effects of Enterprises in Performance Indicators**

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İGDAŞ

Increasing global competition in the world economy enforce the firms to sharpen their functionality and processes comparing their competitors. For this reason, many firms develop management systems. These methods provide interdisciplinary approaches including statistics and operational research by including structure of the firm, market conditions, consumer needs and changes in economy and technology. Among these methods, six sigma approach emerging 1980s provide important and better tools comparing others for firms to achieve their targets in face of their competitors. In this context, main aim of the study is to investigate main structure of the six sigma approach and its characteristics and to analyze the effects of six sigma approach on the firm performance indicators by considering a firm benefiting efficiently from six sigma approach and operating in the white goods sector in Turkey.

**OP-542**

**Persistence of Software Piracy in OECD: Panel Unit Root Approach**

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Software piracy refers to the unauthorized copying, distribution and selling of software in copyright. The unlicensed software use and distribution has been important issue for the industry. It leads to tremendous monetary losses in the software sector. According to BSA the commercial value of unlicensed software in 2013 is \$13.5 billion in European Union and \$17.2 billion in BRIC countries. Moreover many countries that have high software piracy rate, have shown a predilection towards piratizing software in the past. Georgia, Moldova, Zambia and Zimbabwe which has the four highest software piracy rates and all above 90% in BSA's 2013 study have continuously exhibit rates above 90% since 2005. Furthermore the commercial value persistently climbs since BSA has first began publishing studies on software piracy. This brings forth the question whether software piracy has a characteristic inertia. Due to its importance for the sector the persistence of software piracy has may consequences. This study aims to investigate this question for OECD countries using first and second generation panel unit root tests.

**OP-543**

**R&D and Skills: Evidence from Greek Manufacturing Sector**

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In current business reality, with corporate R&D investment being of growing significance, skills emerge as a major factor of R&D activities. While scholars have stressed the macroeconomic idea of skills result on the adoption of skill-intensive technologies, known as "endogenous skill bias", this study

examines the impact of skills on R&D investment highlighting the relevant determinants at microeconomic level. The paper merges a matched employer-employee dataset (the Greek Structure of Earnings Survey) with plant level data from the Greek Survey of Manufacturing for the years 2002 and 2006. Methodologically, in contrast to the vast majority of studies using wages as a skill proxy, alternative measures of skills are employed. Employee's wage, education level and occupation status are considered. For estimation purposes, tobit and probit models are also applied. The set of control variables moreover include a wide range of worker-related attributes (demographic and human capital) and employer-related characteristics (financial, demographic, sectoral and regional). Overall, evidence shows a negative relation between R&D activities and high skilled staff in Greece. Wages are found to have a positive effect on R&D investment up to a threshold presenting an inverted-U profile relationship. In line with this finding, the higher remunerated occupation status categories (skilled and service workers) are measured to have a negative influence on R&D activities. Results, suggesting that Greek firms that invest more on high skilled human capital tend to focus on exploiting existing technology rather than developing new technology, render the implications of the study noteworthy for policy makers and managers.

**OP-544**

**Measuring Operational Performance of ICT Small and Medium Enterprises in Malaysia**

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Information Technology and Communication (ICT) industry has been blooming in Malaysia since the introduction of World Wide Web (WWW) in the year 1998. The impact of rapid development in the ICT industry effects the ICT Manufacturing sector particularly Small Medium Enterprises (SME)s in Malaysia to produce hardware components and products in timely manner despite keeping the quality at par with the International standardisation. Quality Management practices measure the performance but quality does not always have a direct positive relationship with operational performance. Despite various quality management created publications from the literature review, there are less empirical research that have been done so far. In this research, the contingency view of quality management will be examined and prove evident of quality management practices and performance relationship. Quality management practices and performance always postulates an indirect positive relationship. This is based on the differences of operational distinction between original equipment manufacturer and contract manufacturer. The instrument of research will be based on survey that will be conducted in Malaysia's ICT manufacturing SMEs, using company as the unit of analysis. This research will greatly contributes to the domain of knowledge in contingency view of quality management particularly SMEs in relations to operational performance and quality.

**OP-545**

**The Fuzzy Logic for the Selection of the Transportation Type a Firm Application**

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The main purpose of this study is to investigate the most appropriate transportation by using the fuzzy logic when comparing the road, sea, rail, air and pipe transportation in terms of organizing the selection criteria for the type of transportation. In terms of comparison, the speed, security, capacity, appropriateness as well as cost factors and transportation combinations were used. By blurring the transportation combinations, after organizing the mathematical equation, it was decided on which kind of transportation is the most appropriate by considering the speed, security, capacity, appropriateness and cost factors.

When handling with the speed, security, capacity combinations in the comparison of the application and when dealing with the land-rail performance, 2,6388, speed, security, cost combination, when considering land-rail

performance, 2,6388, capacity, cost and appropriateness combination, seaway transportation performance, 2,7369 and capacity, appropriateness, security combination, it was observed and seen that pipe line performance is the best transportation combination as 2,6389.

It was decided that the combined transportation is the most effective when comparing with the speed, reliability and cost criteria of the combined transportation in accordance with the single transportation.

**OP-546**

**Structural Problems of Small and Medium Sized Enterprises in Turkey and Solution Suggestions**

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For the definition of a SME (Small Sized Enterprise), a classification method such as the sales amount, number of employees, capital amount and structure, production method and area of activity is considered. The most preferred method among them is the number of employed personnel and sales revenue. At the same time SME's are the enterprises that are working hard with effort by using less capital and performing cheap production with low-level of production expenses. By the arrangement made in 2012, the definition of SMEs (small and medium sized enterprises) is amended as the "micro enterprises, small sized enterprises or medium sized enterprises" with any of the annual net sales revenue or financial statement under 40 million Turkish Liras and with annual quantity of personnel under 250. SMEs come to the forefront with their features of creating employment, supporting large industries, eliminating inter-zone disparities and being open for flexibility and innovations.

Due to increasing of multinational companies and international companies and expansion of their activity areas since 1980s and especially as a result of globalization process, competitive power of SME against such companies has decreased. More than 95% of the enterprises showing activity in Turkey are small and medium sized enterprises and they have significant contribution in the employment and growth in national economy. Thus the continuation of the SME activities and increment in their competing powers have significant importance. Although SMEs have problems at national and international levels, they also have problems in the meaning of financial structuring and technical structuring on the basis of management within itself. In this study, structural problems of SMEs in Turkey will be mentioned and various solution suggestions will be brought forward regarding to the matter.

**OP-547**

**The Impact of Social Contexts on The Production of Emphatics / Non Emphatic Cognates: Evidence from Socio-Phonetics**

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University of Mostaganem

In this paper our aim is to provide data on the variety of voice qualities as a stylisation of gender and qualify voice characteristics with regard to males and females as members of a teaching community of practice. Drawing on the work of Lave and Wenger (1991) and Eckert and McConnell Ginnet (1992) on Communities of practice, we attempt to locate the speaking subjects in their macro community and investigate the relation between the construction of meaning, namely of femininity and masculinity in that community and the larger social communities with which it engages.

All over this paper, we aim to measure how the community of females and males contextually produce and stylize a wide range of voice quality characteristics and to ascertain the variability of this characteristics within this specified group on the basis of their gender and status as teachers. For so doing, we have looked at how females and males produce the emphatic/non emphatic phonemes of Arabic in MTG. The choice of the emphatic /non emphatic phonemes is not based on speculation; emphatics/ non emphatic cognates have been chosen because they partly influence the quality of voice

**OP-548**

**The Role of Geographical Indications in the Way of Turning Domestic Values into the Touristic Brands: Under the Sample of Azerbaijan**

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The article looks through the developing countries like Azerbaijan in terms of influences of geographical signs on tourism in collaboration with the laws of "Names of Geographical signs and trade brands" and "Geographical signs" of Azerbaijan Republic. Those investigations of making domestic products valuable for tourism, reveal the importance of regional trade on tourism, whenever it is evaluated from the sides of geographical signs.

Especially, geographical signs which have been put under secure in Azerbaijan since 1998 mean it is what explains the roots of the collaboration with a state region and an area, at the same time it illustrates the specific quality, reputation and other features.

It is generally known that although there is an existence of the background with the capability of guarding the Geographical signs, the developing countries including Azerbaijan, own troubles in the area of securing Geographical indications, making them a touristic brand, implementing innovative trade thoughts.

**OP-549**

**Innovative Technology in New Media and Its Effects on Intellectual Property**

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Creation of mind, its value, ownership and exclusive rights has always been a controversial subject on capitalist societies. The main subject of this discussion is "Does the creation belong to artist or to its benefactor or to the public". Creators, companies and public fight for the rights on usage and with new technologies it just became more complicated. Term intellectual property refers to whole wide range of subjects. This study tries to focus on artistic intellectual property.

In our digital culture new media is the best source for people to access art, especially music and access to music is constantly changing with innovative technology. Nowadays online music streaming became increasingly popular throughout world and also in Turkey. One of these streaming companies is Spotify. Spotify is a Swedish online music streaming service that was launched in 2008. Since, its launch Spotify has had a meteoric rise and currently boasts a library of around 30 million music tracks, about 15 million paid (premium) users and over 60 million active users. The company has been giving streaming services in Turkey since 2013. While company claims and seems perfectly legal, this open source, online content is subjected to a lot of lawsuits regarding intellectual property. These digital streaming companies paid intellectual property based on clicks (meaning popularity) so the question is "Can these innovative technologies be new way of music consumption and where the intellectual property stands in this modern age?"

**OP-550**

**New Product Development Success and Strategic Orientations**

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This study aims to effects of culture based strategic orientations on new product success, which is the core output of any innovation related process. Culture based strategic orientations refer to the managerial tools those create bridge between strategy and firm culture. Therefore to achieve this objective this study reveals and tests the joint effects of customer orientation, technological innovativeness, commitment to learning, and opportunity recognition have been employed as strategic orientations on new product success by the evidence of one of the most important industry of Turkey, Marble Industry. A field

study consisting of survey method is selected to collect necessary data to test our hypotheses. Turkey-based national marble firms which were participated in the International Natural Stone and Technologies were considered as the sampling frame. Randomly selected 200 national marble firms out of 898 fair participants were visited in person in their stands during the fair. In the end, the field study was completed with voluntarily involved 67 participants from 52 firms. Preliminary analyses for scale purification and data reduction were done via factor analyses and hypothesis are tested by multiple regression analysis. Findings reveal significant and important results for both researchers who study on strategic management as well as innovation studies, and practitioners who are actively working in this specific industry.

**OP-551**

**Sustainable Design and Production Activities Upon “Domestic Manufacturing”**

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Believed as a third industrial revolution domesticated fabrication technologies such as 3D printing has a potential to transform all production, consumption models after all everyday life. Considering these printers begin to use waste materials like pet bottles, with these digital desktop fabrication technologies based on improved and open source 3D modeling software’s and affordable domestic 3D printers, world is witnessing the attempt of product design, production and reproduction initiatives. Such orientation is revealing from hobbyist; Do It Yourselfers and Makers to manufacturers who rose through online tutorials and fabrication technologies.

On the other hand “Maker Guilds” starting to emerge in large multinational companies like Hasbro to support designers and engineers who have long been divorced from the physical production due to global supply chains (Dods, B., Factoring the impact of additive manufacturing: A model for university, industry, & government collaboration, 2013).

The aim of this study is to examine and analyze contemporary sustainable design business on additive and manufacturing technologies. The aim is to investigate the role of design on sustainability on creating the new world of domestic production.

**OP-552**

**Scripting of Chinese growth in S&T: Key Policy Initiatives Underlying This Evolution and Lessons for Others**

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China has made rapid strides in its S&T growth. This paper looks into the S&T and innovation policies and their role in catalyzing the developments in S&T in China and lessons that can be learnt by India in terms of indicative guidelines. The pointers of development in China indicate targeted development, emphasis on high growth industries and high technology, commensurate resource mobilization, restructuring of innovation actors, etc, within the ambit of continuously evolving policies with appropriate policy instruments and strict enforcement and monitoring of major initiatives. Although both the economies are different in terms of governance and require careful assessment, the essence of growth process and its strategization is important and can provide a useful tool for learning. India reflects dissimilarities with China in its approach of handling the whole issue of role of S&T towards industrial development and institutionalization of policies.

**OP-553**

**Exploring the Imperative of ICT in Effective Disaster Management: Exploring Innovative Vistas for Governments and Populaces**

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This paper aims to identify and analyze the devices utilized within distinctive stages of disaster and looking a way out, to convey in disastrous times. Effective disaster reaction requests fast access to solid and faultless data, ICT hence gives critical help. Development of new wireless technologies, telecommunication mediums, processing and so forth has expanded information accessibility and more terrific arrive at easier cost. This paper closes with our recommendation for such circumstances that in what capacities can ICT be accommodating in breaking down disastrous situations beforehand and to stay away from them and if there should be an occurrence of crisis in what capacity can correspondence be made. Furthermore, Asia and the Pacific region is quick turning into the center of worldwide processing and consumption. Dramatic economic growth has empowered a diminishing destitution and social advancement in numerous parts of the locale, and huge advance has been made in attaining thousand years’ improvement targets. Disaster affects, nonetheless, undermine these achievements at the same time, the openness and reasonableness of various ICT tools are developing at exponential rates in the Asia Pacific region, and policymakers can no more overlook the utilization and profits that ICT’s can carry to lessen disaster chances in innovative ways. Therefore, ICT’s have become essential key to the successful administration of all stages of the Disaster Risk Reduction DRR cycle.

**OP-554**

**How Much Does Exchange Rate Affect the Economy?**

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Aim of this study is to reveal relationship of exchange rate with other variables. Reason to tackle especially exchange rate is that many variables are affected from global fluctuations of exchange rates with different dimensions in macroeconomic level. In this context, this paper analyzes relationship between exchange rates and main macroeconomics variables such as gdp, inflation, interest rates, foreign trade, balance of payments, unemployment, FDI and local credits for an important emerging market Turkey. To determine the development of the country, it is important to detect relationship of these variables with exchange rates. When literature is reviewed it is seen researchers has been generally examining just one or two variables’ relationship with exchange rate by using ARDL bounds testing approach for Turkey. Difference of this study from others is to test movement of many variables together by using ARDL which is one of time series analysis techniques.

**OP-555**

**Productivity, Markups and International Trade: The Case of Small Open Economy**

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Empirical evidence suggests that openness to international trade influences firms’ price-setting behavior, so that exporting firms tend to charge higher price-cost markups than domestically operating establishments. This well-known effect of trade on markups alters in a special case, namely when trade barriers are relatively low and the market size of the home country is smaller than its trade partner. This paper provides evidence on the validity of the small country case by estimating firm-level markups and productivity through a production function specification using firm-level data for Luxembourg. The empirical

results show that non-exporting producers tend to be small and charge higher markups than exporters, because competition is less intensive in the domestic markets. The trade-driven markup variation has important implications for the measurement of productivity. In a small highly open economy, exporting firms' relative productivity may be underestimated by productivity indicators based on nominal data.

### OP-556

#### **The Effect of R&D Expenses on Firm Performance: A Study on Istanbul Stock Exchange**

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This study examines the effect of R&D expenses on performance of BIST industrial index firms for the period of 2004-2014. Panel data analysis is employed at the study, dependent variables are performance measures such as return on equity (ROE) and return on assets (ROA). Explanatory variables used are R&D expenses, total assets, leverage ratio, current ratio and capital working turnover ratio. The study also compares the R&D expenses of sub-sectors that composes the BIST industrial index.

### OP-557

#### **Achieving Smart Growth: The Quest for Comprehensive Policies of Innovation**

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Smart growth is motivated with innovation, research and development and high skilled labor force. It provides the basis of highly innovative and competitive countries' strategies for development. Attaining sustainability in smart growth is quite a difficult task and it requires comprehensive policies that bear multidimensional formulations accompanied by strong financial support schemes. Europe 2020 Strategy puts forward smart growth as an instrument of global competitiveness. This paper presents a comparative study on the innovation policies of European Union and Turkey. The intellectual debate on innovation policies are carried out by referring to two concepts; institutionalism and europeanization. This study discusses the dynamics of innovation ecosystems of both Turkey and EU by referring to four main factors; innovators, enablers, motivators and beneficiaries. Special emphasis is given to the analysis of public sector entrepreneurship in innovation ecosystems to capture the impact of public involvement that contribute to the effective realization of policies. The stimulating role of Turkey's candidate state status is examined as a motivator in innovation ecosystem. In this regard, innovation policies and their potential spill-over effects on other policy areas of smart growth are also mentioned. Europeanization is identified as an enabling factor due to the fact that it encourages private and public partnership in innovation aiming at higher commercialization and economic growth.

### OP-558

#### **Analyzing of the Relationships Among Entrepreneurs' Entrepreneurship, Innovation, Innovative Thinking and Level of Innovative Entrepreneurship**

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The aim of this dissertation is to analyse relationship among entrepreneurs' entrepreneurship, innovation, innovative thinking and level of innovative entrepreneurship. It was conveyed to measure the relationship between and the effect of entrepreneurship, making innovation and innovative thinking on the level of innovative entrepreneurship of the entrepreneurs that joined the research.

The research includes small and medium-sized enterprises in Marmara Region.

201 entrepreneurs from different sector who accepted the research were included in the study.

This dissertation is a personal survey model.

4 dimensional survey was applied at this study. These are entrepreneurship measure, innovation measure, innovative thinking measure and innovative entrepreneurship measure. The measures used at the research were developed by the researchers.

The data obtained at the research were analysed using SPSS (Statistical Package for Social Sciences) for Windows 21.0 program. When the data were being evaluated, descriptive statistical methods (Number, per cent, median, standard deviation) were used.

At the comparison of quantitative data, T-test was used to compare the difference between two groups, if there were more than two groups to compare the parameters among the groups one way Anova test was used and to determine the group which causes the distinction Tukey Post Hoc test was used.

It was seen at this study that there are meaningful relationship among entrepreneurs' innovation, innovative thinking and level of innovative entrepreneurship. According to this research it was approved that entrepreneurship, innovation and innovative thinking have positive effects on entrepreneurs' innovative entrepreneurship.

It can be concluded according to the results of the research that the entrepreneurs should improve their level of innovative thinking, level of making innovation and have entrepreneur feature to improve their innovative entrepreneurship feature.

### OP-559

#### **Towards a Conceptual Model to Dissect a Company's Innovative Capabilities and Strategic Position in a Knowledge Economy**

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Innovation is critical to the long-term survival for any company in the knowledge economy. However, while many studies highlight the importance of companies' innovative capabilities, a practical conceptual mapping with valuation measures has not been clearly demonstrated in the literature. Therefore, this paper proposes a formal conceptual model for evaluating a company's innovative capability based on two dimensions that have been proposed in the literature so far. In addition, our multiplicative innovative value model incorporates a third factor that captures the critical internal "knowledge transfer" capability acting as the catalyst between a firm's R&D innovation capacity and a firm's capacity to generate value in the market place. This factor highlights the interaction and inter-connectedness between the two critical dimensions in terms of the success of a company's innovation: invention and commercialization. We provide a practical and useful mapping for locating a firm in terms of its position in strategic innovation. Boards, managers and consultants pursuing a successful innovation strategy can use this map to identify their future strategic innovation trajectory based a firm's current and desired position on this map. Thus we contribute to the literature and practice of both innovation and strategy.

### OP-560

#### **The Validity and Reliability of the Turkish Version of the Blended Working Scale**

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As blended working combines on-site and off-site working (including online or e-working) in a functional manner to improve workers' and organizations' positive outcomes (e.g., productivity, satisfaction, motivation, collaboration, and workplace utilization), and to reduce negative outcomes (e.g., absenteeism, tardiness, turnover, and time loss) it is very effective way for employers. Therefore to measure and evaluate the blended working attitudes of workers and managers is an important issue. The aim of this research is to examine the validity and reliability of the Turkish version of the Blended Working Scale



(Yperen, Rietzschel, & De Jonge, 2014). Participants were 199 workers. Firstly, the Blended Working Scale was translated into Turkish by six academicians. Secondly, the Turkish form was back-translated into English and the consistency between the Turkish and English forms was examined. Thirdly, Turkish form has been reviewed by four academicians. Finally they discussed the Turkish form and along with some corrections this scale was prepared for validity and reliability analyses. In this study confirmatory factor analysis was executed to confirm the original scale's structure in Turkish culture. As reliability analysis internal consistency coefficients and the item-total correlations were examined. The results of confirmatory factor analysis indicated that the 10 items loaded on three factors and three-dimensional (Time-independent working, Location-independent working, and Work-home segmentation preference) model was well fit ( $\chi^2= 51.20$ ,  $df= 29$ ,  $RMSEA=.062$ ,  $NNFI=.95$ ,  $CFI=.97$ ,  $IFI=.97$ ,  $GFI=.95$ , and  $SRMR=.056$ ). The Cronbach alfa internal consistency reliability coefficients were .76 for time-independent working, .73 for location-independent working, and .75 for work-home segmentation preference sub-scales. The corrected item-total correlations ranged from .42 to .69. Overall results demonstrated that the Blended Working Scale could be named as a valid and reliable instrument that could be used in the field of organizational and industrial psychology.

**OP-561**

**Stakeholder Engagement to Innovation Process: Participatory Approach to Idea Generation and Product Conceptualization**

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Generating creative ideas and developing them into product concepts is an important aspect of the innovation process. This activity is usually performed by a team of experts, who transform an abstract mental representation into a concrete solution to a problem. Refining and conceptualizing an idea to a feasible solution is a greater challenge than the creation of new ideas. This process is habitually actualized by the engineers in a top-down manner considering only the technological aspects. Front-end activities where new ideas are created, directed and transformed into preliminary concepts are usually done in an ad-hoc manner in informal settings in an unstructured manner. However, complex and unstructured nature of this process cannot be handled by engineers only since its features are qualitative and fuzzy. Managing this process requires the collaboration of internal and external stakeholders such as market researchers, engineers, suppliers, user representatives and governmental agencies. This is particularly difficult since all these groups might have incompatible or conflicting ideas challenging the technological precision of the engineering process. Within this scope, the aim of this study is to develop a comprehensive framework for the management of the front end process and offer a methodology facilitating the engagement and collaboration of all stakeholders during the front end process. This is an original effort since the studies in front end management are incomplete in terms of offering a systematic and methodological approach to this process. To this end, we offer a multi-method, multi-stage process, which involves brainstorming, web mining and focus groups to offer a platform for deliberating conflicting ideas. The ideas generated during the brainstorming stage are used as keywords for web mining and topics and issues detected through text mining are offered as discussion themes in the focus groups.

**OP-562**

**The Analysis of the Relationship of Social Skills, Problem Solving and Bullying in Adolescents**

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This study aims to analyze the relationship of social skills level, problem solving and bullying in adolescents. The research is carried out according to the surveying model with a sample of 392 students (210 female and 182 male). To measure the social skills level the adapted Turkish form (Bacanlı & Erdoğan, 2003) of "Matson Evaluation of Social Skills with Youngsters (MESSY)" developed by Hessel (1983) is used. The problem solving skills of the students are aimed to be measured via "Problem Solving Inventory for Children"

developed by Serin, Serin and Saygılı (2010), and the Turkish adaptation by Dölek (2002) of "Bullying Questionnaire" developed by Dan Olweus (1996) is used to measure bullying/victim levels of the students. The data is analyzed using Pearson Correlation Technique. While the study concludes a positive and significant relationship between positive social skills degrees and subcategories of 'trust' and 'avoidance', a negative significant relationship is observed between negative social skills degrees and 'trust', 'self-discipline' and 'avoidance' subcategories of problem solving. Moreover, as a negative significant relationship is explored positive social skills degrees and bullying behavior degrees, a positive significant relationship is found between negative social skills degrees and bullying behavior and being bullied degrees.

**OP-563**

**Innovative Treatments: Effect of Postnatal Magnesium Sulfate Infusion on Neurological Outcome of Term Neonates**

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**Introduction:** Perinatal asphyxia is the fifth largest cause of child deaths. Perinatal asphyxia in case of metabolic acidosis in the cord blood may be followed by a moderate or severe neonatal encephalopathy. Magnesium is a naturally occurring NMDA receptor antagonist that blocks neuronal influx of calcium within the ionic channel. This study is being carried out to find out the effectiveness of this drug, so that the drug can be used for the population in tertiary care hospitals.

**Objective:** To compare magnesium sulfate with placebo in term neonates with moderate to severe ischemic encephalopathy due to severe perinatal asphyxia in term of improved neurological outcome.

**Study Design:** Randomized Controlled Trial. Six months data from 28th January 2013 to 27th July 2013. Neonatal intensive care unit. Pediatrics' Department, Holy Family Hospital, Rawalpindi.

**Subject and Methods:** A total of 70 patients with moderate and severe hypoxic ischemic encephalopathy were included in this study.

Patients were randomly divided into two groups. Patients in group A received Magnesium sulfate and patients in group B were received normal saline. Serum magnesium levels were conducted at seventy two hours of life. All data was recorded on a performa by the researcher.

**Results:** -Infants in group A were sucking at discharge than group B (71.4% vs. 40%;  $p=0.008$ ). Neuroimaging (CT scan on day 14th) yielded abnormal findings for fewer neonates in group A which was significantly low as compared to group B (11.4% vs. 37.1%  $p= 0.012$ ).

**Conclusion:** Postnatal magnesium sulfate infusion is effective in improving outcomes for infants with severe perinatal asphyxia.

**OP-564**

**The Relationship Between Innovation and Financial Performance in Turkish Health Sector**

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The innovation and progress in health sector directly affect the human life and its quality. With the increase of population and the ratio of old population, structure of illness and the needs of health has changed. Furthermore, income level is increased, technology is developed and health system is changed for cover all the population day by day. This increases the demand for better health system and provides advancement for private health sector. The purpose of innovation, move toward innovation in addition gaining competitive advantage thus increase the financial performance by being a strong and successful company. The purpose of this study is determining the innovation capacity and evaluating the relationship between innovation and financial performance of Turkish private health sector. Study was covered medical device firms, pharmaceutical companies and private hospitals. Financial data of firms between the years 2002 and 2011 was obtained from Turkish Central Bank (TCB) without sampling. In the scope of study, it was determined that % 88.4 of 526 (465 companies) private health sector companies was not innovative and only %11.6 of them (61 companies) was innovative during these years. Beside this finding, it was

determined that %7.4 of innovative companies (39 companies) have a good financial performance and % 66 of non-innovative companies (347 companies) have a good financial performance. According to statistical analyzes, it was also found that there was statistical relation between financial performance and innovation only in medical device companies.

**OP-565**

**Some of Muslim Physicians Innovations Still Attributed to Western Minds**

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The concept that medicine is exclusively the products of Western minds, remains unquestioned by most individuals. A review of any of the standard texts or encyclopedias regarding the history of medicine would support this view. The unavoidable conclusion is that major contributions to the development of the modern medicine by other cultures is minimal. Most texts give little or no mention of the advancements made by ancient Indian, Chinese or, particularly, Muslim physicians. Rhazes (al-Razi) was a famous physician and writer, whose medical writings greatly influenced the Islamic world as well as Western Europe. Al-Razi is considered the first who described what is called now Baker's cyst, which is attributed to the English surgeon William Baker (1839-1896) who described it in 1877. Avicenna (ibn-Sina) is considered one of the most celebrated physicians during the Middle Ages. Al-Qanunn Fit-tib (or Code of Laws in Medicine) represents the most important work of Avicenna, and as William Osler described it, the most famous medical textbook ever written. The British surgeon, George Perkins, is considered now the pioneer of what is called the delayed splintage theory, while we can see that Avicenna talked about this theory in his book Al-Qanunn one thousand year before Perkins. The aim of this paper is to shed lights on some of Muslim physicians innovations or contributions in medicine, which still attributed to western physicians.

**OP-566**

**Innovation in Nursing Education: The Integration of Simulation Into Post-Graduate Education**

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Innovation In Nurse Training: The Integration Of Simulation Into Post-Graduate Education Around the world, nurses innovate to reduce costs in health systems, to improve patient care outcomes and to enhance the quality of patient care. Innovations in nursing have improved fields such as education, research, administration, practice, technology, public health and policies. Simulation is an innovation that has become even more important in recent years thanks to research results with a high evidential value. Simulation is an active learning strategy that provide students an efficient and secure learning environment. The studies in the relevant literature demonstrate that the use of simulation helps students be better prepared for professional life and increases patient security. In our country, a small number of schools have integrated simulation into education in undergraduate level and they have very limited facilities. However, relevant literature on simulation in post-graduate education in nursing is not accessible. Thus an elective course entitled "Teaching Simulation in Maternal-Children Health Nursing" was opened in Hacettepe University's Faculty of Nursing Department of Obstetrics and Gynecology in master's and doctoral programs. The aim of this course is to gain knowledge, skills and analytical abilities for use in the instruction of maternal and child health and the assessment of skills. The practical foundation of this course is the high fidelity simulation laboratory and the hybrid simulation laboratory that were established by an EU project run by the course instructors. The instructors are informed about and experienced with simulation. They also have educational certificates in the subject. Innovation should be accepted to be necessary for the creation of all policies and strategies if any kind of innovation is to be made. Institutions should promote innovative and creative practices, provide appropriate environments and act as role models and a leaders.

**OP-567**

**Technical and Human Factors are Associated with Information Security**

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**Aim:** The technical progress in health information technologies improves healthcare quality in hospitals. Since information is processed, stored and transmitted electronically by using hospital information management systems, it is important to ensure information security for both patient privacy and management activities. The aim of this study was to examine the relationship between security related applications and different aspects of information security in the organisation.

**Materials-Methods:** In the study, 424 hospital staff (medical:258 / administrative:166) in a hospital were included. Data were collected by a questionnaire regarding information security related applications, information security scale regarding "security policy", "organisational security", "security applications", "service delivery" and "access and authorisation" subscales. Scores of items coded by a 5-point Likert scale were calculated in each subscale. Low scores were associated with poor information security status.

**Results:** According to staff opinion, score of "service delivery" subscale were higher in updated systems (p=0.000) and turning off computers when leaving office (p=0.000 and p=0.001). USB blockage in computers were related with high scores of "service delivery" and "security policy" subscales (p=0.000 and p=0.016). Increase in scores of "access and authorisation" and "service delivery" subscales were associated with not sharing passwords (p=0.004 and p=0.000). High score of "security application" was observed in using number and letter combination in password selection (p=0.000). Moreover, when data were analysed according to staff's profile, the ratio of all security applications and score of "service delivery" were seen to be high in medical staff compared to administrative ones (p<0.05).

**Conclusion:** Since both technical and human factors are closely related with information security, technical applications were not enough to improve security. In addition, information security awareness of medical staff could be different compared to administrative ones due to patient privacy in clinical practice.

**OP-568**

**Nursing Students' Perceptions of Simulation Design in Problem-Based Learning**

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Merging problem-based learning and simulation enables students to think critically and broadly, and to integrate clinical skills, communication and teamwork to deal with patients' conditions.

**Objective:** The purpose of this study was to describe students' perceptions of simulation design in problem-based learning.

**Method:** The descriptive study was conducted with a purposive sample of 85 baccalaureate nursing students in Macao. The students voluntarily participated in the 36-hour high-fidelity simulation within problem-based learning. The Simulation Design Scale was used to evaluate the simulation design in terms of objectives and information, support, problem solving, reflection and fidelity. An open-ended question was asked how the students feel about simulation design. Results: Majority of students considered that learning objectives were clear and understandable. The learning information was appropriate and geared to promote their understanding. They were involved in supportive environment. They had opportunities to prioritize nursing assessments and care, and to obtain feedback from the teacher in order to build knowledge to another level. However, some students complained that the information was insufficient (18.8%), and sometime their needs for help were not recognized by the tutors (21.2%). Students' written comments showed that the simulator could not replicate social and psychological responses. It was difficult to anticipate the reactions to real-working situations through simulation. Conclusions: Students were supported in the leaning process and incorporated what was taught in theory to develop reasoning skills while providing nursing

care for the simulated patients. Fortright responding to a situation during the scenario is essential for improving the quality of learning. More studies to test the impact on cost efficiency and faculty perceptions will provide valuable support for using high-fidelity simulation in nursing education.

**OP-569**

**New Approach in the Physical Therapy Demonstration for the Patients with Ankylosing Spondylitis in Turkey**

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Ankylosing Spondylitis (AS) is a chronic, systemic disease. AS effects many joints in the body with infammation and pain especially spine. AS may end in disability. Its aetiology is still not defined but there are some findings and foresights. There are no any successful treatment still, but all the treatment methods are using for reducing the pain and morning stiffness of the patient. These methods prevent patients deformity and protect correct body posture, physical condition and mental health. Exercises are accepted as a primary treatment to rise the functional skills and prevent deformity progress. In addition, exercises are using for joint motion, flexibility, muscular strength and augmenting coordination. Training and intensive exercise programmes for the rehabilitation of patients with ankylosing spondylitis are currently applied with photocopy papers or brochures in Turkey. Therefore, this study performed to applying a new approach. A new software application was developed that demonstrates the predefined exercises. All the mandatory and crucial exercises are defined and controlled by the physiotherapist. These exercise definitions are not the ordinary videos or images because of attracting attention of patients and providing ensuring correction of exercises. The application uses skeleton data to demonstrate exercises. The Kinect camera is used by the application to get skeleton data of body. Application records 30 frames per second for each 20 joint of body. Thanks to developed software application, it is expected that patients can do exercises more successful. Consequently basdai and basfi scores of the patiets can be increased, this means that; exercises which seemed as a primary treatment method succeeds for the patients.

**OP-570**

**Teacher's Approaches in Teaching 'Seni dalam Islam' (AA206) Polytechnic Malaysia: Developing 'Seni Mardhatillah' Model**

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This study aims to identify the approach used by the lecturers course (AA206) 'Seni Dalam Islam' to students of architecture at the polytechnic in Malaysia. This study used a qualitative research approach through classroom observations and interviews as research instruments. To study the situation in greater detail SIX respondents consisted of students who take this course involved for giving opinions. The findings show that respondents are less interested students to attend this subject classes because the lecturer lecturing approach. Lecturers were lacked creativity to diversify teaching methods. They make full use of the modules provided by the Curriculum Development Center. Students of architecture has a great potential to adapt art with religion in their designed buildings. This study is important for the process of collecting information for developing an architectural islamic model. Researchers would like to introduce a model 'Seni Mardhatillah' or to please Allah between architecture student in Malaysia.

**OP-571**

**Metaphor Perceptions of Gifted Secondary School Students About "Mathematics"**

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The purpose of this study is to reveal the perceptions of gifted secondary school students regarding the concept of 'mathematics' through metaphors. Metaphors are powerful tools for revealing their point of view towards mathematics. For Lakoff and Johnson (2005), who believe that metaphorical relations form a considerable part of conceptual system, metaphor is to understand and experience a phenomena/fact according to a phenomena/fact. There are many research revealed that metaphors, in recent years, are said to be a powerful means of research determining perceptions (Inbar, 1996; Guerrero and Villamil, 2002; Saban et al. 2006). 186 gifted students participated in the study. Research training program was conducted during 2014-2015 at Bağcılar Enderun Gifted students center. Whether the concepts produced in the scope of this study differ according to their class levels and gender or not was searched. The data of the research was obtained by completing the blanks in the sentence 'Mathematics is like ..... because .....'. The students were asked to write down a metaphor about the mathematics to the first blank and to explain the reasons why they wrote this metaphor. The data collected in this study was analyzed by using content analysis technique. According to the findings of the study, i) gifted secondary school students produced 145 different metaphors regarding the concept of mathematics teacher ii) the metaphors produced by these students were classified under 8 conceptual categories. According to the findings, it was appeared that students mostly produced positive metaphors Under the lights of findings, suggestions for future studies were made by expressing the fact that metaphors can be used as an important research instrument for explaining and understanding the perceptions of gifted secondary school students regarding 'mathematics'.

**OP-572**

**ICT and ELT Classrooms**

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After more than one decade of its official insertion in the Algerian educational system, ICT hasn't yet shaped a place in ELT classrooms. Many reasons affect its normal use and prevent both teachers and learners from the best it can offer as learning facilities. In this context, "ICT and ELT Classrooms" is an attempt to tackle the main problems and difficulties that face ICT application and discuss the possible solutions according to the available pedagogical means. The present paper deals with the suitable methodologies that can fit adequately ICT tasks within ELT classrooms as well as the main major post-era approaches and the ways they could be converted into measurable pedagogical objectives. The present paper focuses also on the main advantages of information and communication technology in education (ICTE) and how it reinforces learners' motivation and autonomy.

OP-573

**Measuring The Maintenance Management Performance at Education Endowment-Based Buildings: Case Study of Johor Bahru**

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Endowment or waqf is an important component of the Islamic economic instruments since it is beneficial to help those needy in the community. The practice of endowment (waqf) has been around since the early of Islamic civilization history until today. The potential of endowment funds has been made significant contribution in dealing with the recent global financial crisis, shrinking public revenues and highly demand and increasing cost of health expenses, education and community development. In Malaysia, the development of Madrasah, Sekolah Pondok and Sekolah Agama Negeri are among the examples of education endowment being practiced since the early 1880s. These education endowment-based building is regulated and managed under different laws and regulations within the purview of the States Islamic Religious Council consisting of thirteen states and federal territories leads to the inconsistencies in the management and maintenance of the buildings. Maintenance is an important continuous operation to keep the buildings, furniture's and equipments in the best form and standard for normal use. Unfortunately vast education endowment-based buildings are ill-managed and not getting basic repairs and maintenance. The inevitable consequence is much dilapidation and disrepair. The purpose of this study is to identify the key aspect for maintenance management of education endowment-based buildings, in order to enhance maintenance service delivery. A mixed method was adopted with the selection a total number of Sekolah Agama in Johor Bahru as the case studies. Questionnaires were distributed to the management division and end users. The result indicated that majority of the maintenance divisions did not emphasize several criteria of service characteristics. Henceforth, this study provides significant suggestions and strategies for the future research on endowment administration, management and maintenance.

OP-574

**A Research on Determination of Relationship Between Emotional Intelligence and Entrepreneurship Intention In Computer Education and Instructional Technologies**

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Emotional intelligence and entrepreneurship intent have been one of the theme which has often been studied recently. Entrepreneurship intention is affected by individual, demographic and environmental elements. This study has been done to find out whether there is a relationship between the emotional intelligence dimensions and the entrepreneurship intention of the university students. In this study, data were collected with a questionnaire from 980 students who were study in Computer Education and Instructional Technologies (CEIT) of the universities in Turkey. The impacts of demographical factors and individual features of the students on the emotional intelligence and the entrepreneurial intentions were investigated. Gathered data analyzed with t-test, one-way ANOVA and correlation analysis according to research questions. With respect to the research results, dimensions of emotional intelligence positively affect entrepreneurial intent of university students. Moreover, results indicated that while age, gender, previous job experience, and monthly income of the family differentiated the entrepreneurial intentions of students.

OP-575

**Effect of Homogenization Medium on Permittivity of BaTiO3 by Solid State Reaction**

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Influence of the homogenization medium on the dielectric properties of BaTiO3 ceramics by solid state reaction between BaCO3 and TiO2 is investigated. BaCO3 and TiO2 powders were mixed in different medias (deionized water, methanol and acetone) using compact mixer shaker with motion orbital for 18 hours all together. All muddy mixtures were dried at 120 °C for about 1 hour. Then the powders calcined at 1100 °C for 4 hours simultaneously. Structure of BaTiO3 ceramic powders were verified by X-ray Diffraction (XRD). The ceramic powders were pressed at 235 MPa by computer-controlled press machine into disc shaped pellets and sintered at 1300 °C for 2 hours at the same time. Raman Spectroscopy showed that sintered pellets were purely BaTiO3 besides there are differences in intensity of Raman peaks. Scanning Electron Microscopy (SEM) images showed the sintered pellets have different grain sizes. The biggest grain size of samples prepared in distilled water, while the smallest grain size in acetone. Complex permittivity and resistivity of ceramics were studied by dielectric spectrometer in a wide frequency range of 100 µHz- 20 MHz at room temperature. Real part of complex permittivity of sample mixed in distilled water, acetone and methanol are 13.2, 18.8 and 24.9 at 1 MHz respectively. Imaginary part of complex permittivity of samples prepared in distilled water, acetone and methanol are 0.05, 0.11 and 0.44 at 1 MHz respectively. Resistivity of samples was changed that sample homogenized in distilled water has the highest resistivity while sample homogenized in methanol has the lowest resistivity.

OP-576

**Thermally Stable Encapsulation Material Based on Green and Red Lanthanide Phosphor for White Light Emitting Diodes**

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This study reported thermal stability of hybrid sol-gel encapsulation materials doped with lanthanides complexes for generating white light. Red and green phosphor, Eu(tta)<sub>3</sub>phen and Tb(4DBBA)<sub>3</sub>TPPO lanthanide complexes were incorporated into VTES:TEOS hybrid solgel with different phosphor ratio (1:20, 1:30, 1:40 and 1:50) and underwent aging process before dispensing into 390nm UV LED package. Thermal properties of the doped encapsulation material were analysed by TGA. The encapsulated LED packages was powered with forward voltage of 4.2V continuously and photometric measurement was conducted at time interval of 24h, 48h and 72h to evaluate the effect of different phosphor ratio on thermal stability of the encapsulation material. The photometric measurement were recorded using integrating sphere for the properties of Color Rendering Index (CRI), Color Temperature, Commission Internationale de L'Eclairage coordinates and lumen. Based on the results, the phosphor ratio of 1:40 produce the nearest coordinate within the white color region, CRI up to 80 with color temperature around 4200K.

OP-577

**Effects of Scan Rate and KOH Electrolyte Concentration in Mesoporous Carbon Electrode**

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Effects of scan rate and electrolyte concentration on mesoporous carbon for supercapacitor application had been studied. A series of mesoporous carbon sample was synthesized using modification of silica template, SBA-15 and glucose as carbon precursor. To obtain a large pore of mesoporous carbon sample, an appropriate amount of glucose was added into a large pore size of SBA-15 using incipient wetness impregnation method. The mesoporous carbon sample was then carbonized at 875 °C, 2 °C/min for 4 hours under inert condition followed by refluxing process for silica removal. The effect of different scan rates (10, 20, 30 and 50 mV/s) was investigated using cyclic voltammogram technique. It reveals that the best scan rate is attributed to 10 mV/s implying that the interaction between the ions and electrode is greatly increased. While the use of 6M KOH electrolyte concentration was observed to provide the highest specific capacitance which is due to the sufficient number of ions for double layer building up.

OP-578

**Effect of the Addition of Chemical Stabilizers on the Strength and Durability of Clay Characteristics**

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In the interest of economy, using the locally available materials is one of the main requirements in minimization of construction cost. Faced with an ever increasing problem of providing adequate yet affordable housing in sufficient numbers, the local authorities in Algeria encourage research to develop low cost, readily available and durable building materials. The use of earth as a building material offered numbers of advantages such as the utilization of local material, making quality housing available to more people and generating local economy. However, some of the drawbacks using earth alone for construction are its lack of durability and shrinkage cracking under the action of the weather and its low strength. Hence earth material needs stabilization to increase its strength, durability and shrinkage characteristics. Among the several types of stabilization, the most promising technique is chemical and/or mechanical stabilized soil. Many research have been done on soil stabilization using mainly cement and lime stabilization. This paper presents the results of an experimental study on the strength, durability and shrinkage characteristics of stabilized soil. The effect of the addition of chemical stabilizers such as cement, lime, filler and their combination on the characteristics of clay was examined and discussed. The mechanical properties were evaluated by conducting compressive and tensile tests using different methods of compaction. Mechanical stabilization by dynamic compaction of a local clay sandy soil was found to enhance the mechanical properties and water resistance of the soil as compared to the static or the vibro-static compaction methods. The durability was evaluated by conducting series of wetting-drying cycle and weight loss tests. The study shows that the durability of earth material can be improved by cement and lime stabilizers.

OP-579

**Electrochemical and Mechanical Properties of Surface Films and Their Relation to the Stress Corrosion Cracking of Steels**

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Electrochemical and mechanical techniques were used to grow films and study some of their properties. Polarization curve measurements were performed on Cr-Mo alloy steel specimens in carbonate/bicarbonate solutions at 75 °C. Films were grown at -700, -725, -750, -800 and -850 mV at 75 °C. It was found that stress corrosion cracking (SCC) was most likely to occur between -650 and -750 mV (SCE). Ac impedance and nano-hardness of the films were measured. The results showed that the impedance of the films grown within (SCC) range had diffusion control behavior which indicated passivity whereas the impedance of the films grown outside the (SCC) range showed charge transfer behavior which meant that they were not passive. This result implies that the passive films might cause SCC in Steels. The films grown within the (SCC) range had relatively high hardness compared to those grown outside the range which indicated that the films grown within the range were brittle and might induce SCC in steels.

OP-580

**Entrepreneurial Cybernetics: Indigenous Entrepreneurship Models for Developing Countries**

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*Koc University*

We are moving into a new entrepreneurial economy and nations are moving into a reorganization period to create and sustain a global economy that fosters job creation, innovation and competitiveness.

For nations who wants to create an entrepreneurial ecosystem there has to be a mechanism to swiftly change the understanding of the old economy into a new one. This mechanism we call entrepreneurial cybernetics has to be indigenous and requires creating entrepreneurs, motivating investors and letting government facilitate. All three has to evolve in a way to support each other and create synergies when the mechanism gets mature over time.

As an example, Silicon Valley is investigated. Mechanism of the Valley, future direction of the Valley, history understanding the model are important not for replicating but for leveraging as India, Israel and once Ireland have done.

In our paper, we detail our understanding for a novel entrepreneurial cybernetics mechanism for those who are late in the race.

OP-581

**In the Digital Economics Age, The Future of Central Banks and Banking After Global Financial Turmoil**

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After 2008 Global Financial Turmoil, a new age has begun with new horizons never seen or experienced in economics and finance agenda. Central Banks which are firstly responsible of managing the value of the money and price stability, played important roles in money supply and monetary base expansion after 2008. Its independence, monetary policies, Gold Standart and after, inflation targeting, interest rates ve relations, balance sheet, seigniorage, derivatives, supervisory functions and so on topics, headlines are discussed and adressed in many academic papers and professional works. Changing form of the money in the digital age and liberalisation of printing / issuing money as well as developments on the payment systems, in order to respond to global financial crisis expanding their balance sheets and liquidity by monetary policies, entrance and becoming an active player of non financial finance institutions are forcing Central Banks and Banking to plan their own futures and regarding these, this paper is now becoming inevitable. This paper is aiming to adress and discuss the future of Central Banking and Banks in different perspectives mainly in an innovative and futuristic way of thinking. Most of the arguments could be seen as an utopia for today and could be seen or seemed as non academic with today's disciplines but future is directly related with imagination and estimation.

OP-582

**Consumers' and Physicians' Perceptions About the High Tech Health Products: A Study on Wearable Technologies**

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Wearable technology is the next frontier of innovation in cloud-connected wearable sports, fitness, virtual reality, gaming sensor and most importantly healthcare accessories for smartphones. Like the other technologies such as laptops, tablets and smartphones before it; wearable technologies are becoming common among consumers for using basic activity trackers such as counting steps and calories burned and more complex activities that can track the body's vital signs and help people with chronic medical illnesses such as emphysema, diabetes, or heart failure.

This study aims to discuss the question of "how consumers and physicians perceive high tech health products like wearable tech?". Perceived usefulness and perceived risk of innovative wearable health products will be analyzed from the perspective of consumers as well as physicians. This paper also tries to find out the consumers' and physicians' intention to adopt this innovative technology.

OP-583

**Defense Expenditures and Economic Growth**

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Defense expenditures are perceived as unnecessary disbursements and burden on an economy because expenditure on defense diverts the source division of that economy from the advance assignments. The defense expenditures of Pakistan always remain high in order to maintain a reliable prevention, important geostrategic position. It can be considered as state's duty to follow the goals of safety and prosperity. Defense budget consumes a major part of an economy; therefore the spending pattern on defense and its effects has been under the discussion of scholars. The spending pattern of the defense rests on the existing condition as well. The research is undertaken to carry out study "Effects of the Defense Expenditure on the Economic Growth of Pakistan 2000-2008". The present study analyzes the effects of the defense spending while considering the security issues and its impact on economic growth of country. The present study was therefore to investigate effects of the Defense expenditure on the Economic Growth of Pakistan.

OP-584

**Controlling Electrical Devices with Human Brainwaves**

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Advancements in user interface started its initiation from punch cards and magnetic tapes to today's multi-touch and Gesture controlled devices. The next phenomenal outcome of the user interface would be brain computer interface, instead of general neuromuscular activities brain computer interface acquires direct input from the brain as signals process, analyze and transmit input to the desired output action. The brain computer Interface will be a revolutionary technology for people disabled by neuromuscular disorders. There are numerous hardware devices available to capture the brain waves and process them one such is the EEG (Electroencephalography) device, the EEG registers the ionic current flows within the neurons of the human brain along the scalp. The device has specific electrodes that records the neural oscillations of the brain and converts them into signals. The gathered signals are processed digitally and connected with the electrical devices to trip them on or off. The paper is proposed in minimizing the complexity available in the current brain computer interaction system and to gain high efficiency.

OP-585

**An Efficient Car License Plate Detection Using Genetic Algorithm with a Camera Distance within a Given Range**

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Automated License plate recognition system involves the use of camera device and image processing to automatically detect, extract and recognize vehicle license plate. This paper proposes a new approach to the license plate detection process. As with any object detection problem, accuracy of the plate detection greatly depends on the distance between the camera and the object. In this work, instead of the traditional fixed distance to camera, we propose an approach that allows selectable camera distance range that produces images with variable plate sizes. The implementation uses the genetic algorithm to randomly select a region of an image with a size within the selected range at a random point within the image, then the region is evaluated and a similarity score to the region is assigned by an expert system which utilizes a trained neural network. The process continues over stipulated iterations of the genetic algorithm until a region with similarity score greater than the specified threshold is obtained. This region is then labeled and output as the detected plate region. The proposed approach is tested on a database of car images from the publicly available car image database. The database comprises of images with license plates with various sizes.

OP-586

**Innovative Ideas Through Collaboration with Potential Users**

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Organizations increasingly use environmental stimuli and ideas from users within participatory innovation processes in order to tap new sources of knowledge. The research presented in this article focuses on users who shape the distant edges of markets and currently are not using products and services from a domain – so called potential users. Those users at the peripheries are perceived to contribute more novel information, by which they better reflect shifts in needs and behavior than current users in the core market. Their contributions in collaborative and creative problem-solving processes and how they generate ideas for discontinuous innovations are of particular interest. With an experimental design, we compare ideas from potential and current users and analyze the effects of cognitive distance in collaboration and the utilization of explicit and tacit knowledge. We find potential users to generate more original ideas, particularly when they collaborate with someone experienced within the domain. Their ideas are most obviously characterized by an increased level of surprise and unusualness compared to dominant designs, which is rooted in contexts and does not require technological leaps. Collaboration with potential users can therefore result in new ways to leverage technological competences. Furthermore, the cross-fertilization arising from cognitive distance between a potential and a current user is asymmetric due to differences in the nature of their utilized knowledge and personal objectives. This paper discusses implications for innovation research and the management of early innovation processes.

OP-587

**Women Entrepreneurship: Contribution of Human and Social Capital to Overcome Gender Stereotypes**

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A growing body of scholarship documents the prevalence of unconscious gender stereotyping in social and economic spheres of life. The ascription of gendered stereotypes devalues women in the socio-economic context and in modern work organizations. Gendered stereotyping occurs through a binary division

where stereotypical behaviors are associated with masculine and feminine traits where the former is more valued. Consistent with this gendered stereotype view, entrepreneurship scholars found that entrepreneurship is also widely considered to be a male-specific task. Entrepreneurship characteristics are perceived to be masculine traits. To overcome this gender stereotyping behavior human and social capital plays a vital role for women entrepreneurs. Human capital in the form of individual resources like education, training, and work experience serves as the basis for obtaining different types of resources. Woman entrepreneur with a strong human capital inspires confidence among the resource providers that she has the individual qualities necessary for the creation and running of a business. Similarly, social capital in the form of networking allows the women entrepreneurs' timely and efficient access to information, advice, and resources. Effective embeddedness in social networks enables the women entrepreneurs to enter the domains where they are considered as "outsiders". Thus, for women entrepreneurs, human and social capital contributes tremendously to overcome the gender stereotyping. However, there is a gap in the literature about the role of human and social capital in overcoming the gender stereotyping. By using qualitative research methodology this study is an effort to fill this gap. We conducted interviews with 12 women entrepreneurs running their businesses in ODTU Teknokent. The results of our study offer insights about the significance of human and social capital for overcoming the gendered stereotyping and also have implications for public policymakers.

OP-588

**From Innovation Potential to Innovation Capital**

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Today, innovation is the driving force of many economies in the world. The countries that has the necessary ingredients to foster such an environment that turns innovation potentials to innovation capitals will be the leaders not just in technology but also in other areas as well. In the last decades, we have observed that a handful of people working out of a garage can be the seed of multinational companies that are valued more than the GDP of many countries. These transformations only took 10 to 20 years that is even a short period for a human life. The handful of people in the garage had innovation potential. Now, the company has innovation capital. As, it can be deduced there is a transformation from innovation potential to innovation capital. Innovation potential can be defined as the innovative idea that has the potential to generate value therefore commercialization. Innovation capital is the tangible and intangible assets of a firm that can successfully turn a bright idea into innovation. In this paper, we investigate the transformation process from innovation potential to innovation capital via measuring the identified tangible and intangible assets of an organization. We will provide a measurement framework for identifying whether the innovation capital growth is sustainable or not. We believe this framework will form a baseline for the development of various metrics for organizational innovation. Furthermore, such a framework will guide the managers of start-up companies in their quest to become one of the top innovative companies.

OP-589

**The Situation of Turkey among EU Countries in Terms of Women Entrepreneurship Indicators: A Statistical Analysis**

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Women's participation in the labor force and entrepreneurial activity has a strategic importance for the emerging economies. Increasing the effectiveness of women in the work is seen as crucial to both society and women. Although women's labor force participation is not at the desired level, they are becoming more active in economic life every day. The studies in regarding the participation of women in working life in Turkey has increased. Especially in our country with a fragile economy, women play an important role in economic growth, increasing employment and creating long-term competitive advantage that enables businesses operating on a global scale. As a result to contribute to Turkey's social and economic development, the number of women entrepreneurs should be increased and existing women entrepreneurs should be

strengthened and supported. Many studies are made in order to increase women entrepreneurs in the EU. In this study, it is intended to establish the position of women entrepreneurs in Turkey among the EU countries according to various indicators. These indicators are; the ages of the men and women entrepreneurs, the education levels, labor force participation rates and the sectoral distribution of the men and women entrepreneurs. In order to make cross-country comparisons, research was performed by multivariate statistical analysis of the clustering and multidimensional scaling analyzes. By analyzing EU countries and Turkey with each other in terms of women's entrepreneurship indicators it is intended to put forward how similar or differentiated these indicators are. The results show that Turkey's women entrepreneurship indicators was observed to take place at about the same location as emerging countries.

OP-590

**Different Role of Government-funded Research Institute and Universities within the Korean Government's R&D System**

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This paper examines how government-funded research institute and universities play a different role in the R&D performance management system in South Korea. According to the preliminary interviews with the staffs working in both institutions, interviewees argued that government-funded research institutes have to engage into the advancement of SMEs. On the other hand, they posited that the universities should be connected to starting a new business (entrepreneurship). This study explores whether this preliminary views are valid enough to apply to the R&D policy in Korea for the future. The discussions and implications on the different role of government-funded research institute and universities are followed.

OP-591

**Testing Whether Innovation is Beneficial or Not: Political Economy of Financial Innovation and Financial Crisis Relation in the 2008 Financial Crisis**

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Financial innovations have been developing since the early 1990s after the globalization process had begun in the 1970s, and accelerated in the 1980s. Especially, financial derivatives, special purpose vehicles (SPV), money market mutual funds, hedge funds were crucial innovative products and corporations in the financial markets between the early 1990s and up to the 2008 financial crisis time in the world wide during the liquidity glut time. Besides the products, and corporations, the regulatory policies were turned to deregulation policies in this period. The products and corporations had been becoming dangerous for the economies during that time due to their increasing leverage and, they had uncontrollable conditions. The invention intention of the products and corporations are ameliorating to liquidity condition, financing to real sector investments and projects, however, their role changed, and the products and corporations had become predatory for the economies. In this paper, the financial innovations of which invention intention was transformed to harmful purposes due to those conditions are underlined above are scrutinized and examined between 1990s and pre-crisis period.

OP-592

**Evaluating the Effects of Microcredit Implementators on Women Entrepreneurship and Alleviating Poverty in Turkey**

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Microcredit has emerged over the past 30 years as a mechanism to fight poverty and to provide sustainable regional development especially in developing countries. The main aim of microcredit is to deliver small scale financial services on a commercial basis to households who are typically considered nonbankable by the mainstream financial sector because of their social status. By providing financial services to the poor, microcredit has thus emerged as a vehicle to fight poverty by stimulating economic development and social inclusion.

Due to the fact that microcredit has evolved significantly since the early days of its implementations and it has reached enormous success in alleviating poverty in many parts of the world, it is started to recommend almost every country by the UNDP and IMF as a new tool to make the poor economically active. A few nonprofit organizations in Turkey including Turkish Foundation for Waste Reduction and Foundation for the Support of the Women's Work considered these new developments into account as well by initiating two programs regarding microcredit in Kocaeli and Diyarbakir in 2002. After that these two organizations continued their microcredit activities by expanding their implications to other cities.

In our study, we intend to research microcredit implementations of these two above mentioned foundations in Turkey from different aspects. We will evaluate whether the current applications of microcredit in Kocaeli and Sakarya has been successful so far in the sense that if they have some positive economic and social effects both on households who use microcredit and on the region as a whole. Additionally, it will be searched whether microcredit applications motivate the women entrepreneurship or not.

OP-593

**A Lesson for the Istanbul Banking Sector by Using Capital Asset Pricing Model's Result Obtained from Pakistan**

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The study has been carried out by using Capital Asset Pricing Model (CAPM) to determine that whether Capital Asset Pricing Model is the best option for estimating the stock return on banking sector in Pakistani capital markets. The data for the period of 2002 to 2012 has been taken for which the time series yearly based pooled has been applied. The Capital Asset Pricing Model was applied for the size and book to market portfolios for banking sector comprising of 20 banks. However, Capital Asset Pricing Model is used to address the problems of predictive power and robustness of results. As, a results, the excessive return taken as dependent variable reflects that the investors required excessive return over the above risk free rate (Rf) in order to take any additional risk, while independent variable used in study was market risk premium. The same Model will be applied on Istanbul Banking Sector to study that whether the Investors of Istanbul can mitigate the risk factor with the help of Capital Asset Pricing Model and if the results came to be positive then the same can be applicable for all emerging economies and especially for Regional Cooperation Development (RCD) countries.

OP-594

**The Relationship Between Financial Innovation and Profitability: Empirical Evidence from Turkey**

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Banking system has been growing with technological developments and innovative productions. Banks started to go beyond their basic scope, deposit-credit binary and payment functions with genesis of modern banking. This period has made progress above estimations with the help of computer and

internet technologies, putting limitations away. Fast growing innovative investments and expense productions created a market in banking sector and the importance that banks attached to innovative activities just as traditional activities has gradually increased.

Over the last years, banks have been trying to increase their portions of productions, positively influencing profitability like credit cards, telephone banking, online banking as a result of reduction in net interest incomes in our country. The fact, consisting the hypothesis of the study, is the fact that innovative productions in Turkish banking system positively influence profitability of banks. In this study, the relationship between profitability of Turkish banking system and online banking, telephone banking and credit cards will be examined. In this study, total net profit for the period in Turkish banking system will be considered as an independent variable by trimesters, and online banking, telephone banking and credit cards, tested to see whether they influence this profitability, will be considered as dependent variables. Given data will be achieved from official sources between 2011-2014 and simple regression analysis will be used in this study.

OP-595

**The Role of Financial Innovation and Derivatives in Turkish Economy in the Context of 2008 Global Crises**

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Goods and services trade have been shifting from local level to international level as well as finance and investment decisions, whilst international trade has been rapidly developing. These developments naturally affect the world financial markets closely. The fluctuations in interest rates, exchange rates and commodity prices have created a need for hedging against the risks which led to the improvement of new financial products. International financial markets which have flexible structure are concurrent with risk. Within that context, derivatives have been the most commonly used financial instruments for hedging the risks.

In Derivatives markets, contracts made concerning an asset or a financial instrument between a buyer and a seller entered into today regarding a transaction to be fulfilled at a future point in time. The derivatives markets incorporates; forward, swap, futures and options transactions. Forwards, futures and options contracts is used for protecting against changes in exchange rates, interest rates and the prices of materials whereas there is no default agreement in forward contracts. Banks, the principle actor in financial markets, finds derivatives favourable in developing countries like Turkey in which there is high interest rates and inflation. In this context, financial innovation is continuing progressively as compared with late 1980's. It is crucial to express the role of the derivatives markets, whereas the uncertainty concerns are perceived enormously. 2008 mortgage crises, the main cause is stated as to sheer of expectations, which started in US and spread out to all developed and developing countries evoke to encounter against risks intensely. The aim of this paper is to study how efficient is the use of the derivatives market instruments in Turkey, a developing country, by the banks and other financial market actors after the 2008 Global Crises.

OP-596

**The Effect of Innovation on Financial Performance: A Research Study Involving the Most Innovative Companies in Turkey**

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Fast developments in the world, advances in technology, and globalization bring changes to the needs and expectations of the customers nowadays. Because of that, companies should include a number of changes and differences on products, services and processes for the survival. These changes and differences, the most important factor to providing a competitive advantage are realized by innovation. As a result of this, companies must participate in innovations to stay ahead of the competition and to gain market share in the increasing competitive business environment. Companies which are growing



fast in today's highly competitive business environment, should take into consideration research and development (R&D) expenditures to be innovative. Therefore R&D has been gaining importance in the global scale. Companies today have no other choices rather than being innovative because of the fast and radical changes occurring in the business environment and this situation makes R&D activities strategically more important for them. Hence in the global world, it becomes inevitable for companies to create new trends and become innovative by the purpose of improving business performances and discovering development and growing strategies. The modernist companies which successfully act in innovative fields are proving the need for this thought with their success stories. At this point, in this study the effects of R&D expenditures of the most innovative companies in Turkey as an indication of innovation on financial performance have been investigated.

**OP-597**

**Appointment Systemdesign for Operational Performance Targets**

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Our motivation in this research is to facilitate effective and efficient use of medical providers' resources and capacity while simultaneously recognizing the value that patients place upon their time while waiting for outpatient services. This paper attempts to develop a methodology and its online implementation software for designing appointment scheduling templates that are geared to meet operational targets of (1) managed and fair waiting times to meet patient expectations; and (2) dependable session end times to control providers' overtime; and by extension (3) reduced unintended idle time for providers. This investigation deviates from the traditional cost-based approaches which try to optimize waiting and idle/overtime costs based on their presumed relative importance. Instead, our approach establishes appointment templates based on each patient's [probabilistic] service completion-time distribution, leading to appointment intervals that limit the respective probabilities of each patient's wait time exceeding a desired threshold (E.g. 80% of patients wait less than 20 minutes); and the session end-time to exceed a tolerable delay (E.g. 90% of sessions experience less than 30 minutes of overtime). We use an iterative simulation methodology to establish the probabilistic limits for successive patient's service completion times, where each patient's service completion time distribution determines the next patient's appointed arrival time. Our findings suggest that the resulting templates follow generalizable patterns, moderated by allowances that account for service time length and variability, patient show rates, and managerially established performance targets of patient delays and providers' overtime. We demonstrate that patient appointments that meet these operational targets can be scheduled in a real-time environment, while the low-level software provides dynamic assistance in selecting appointment slots. The solution methodology we develop in this setting may also be easily adapted to surgical scheduling domain as the conflicting objectives of avoiding providers' idle/over time and procedures' completion time delays involve similar costs.

**OP-598**

**Study of Calcination Temperature and Concentration of NaOH Effect on Crystallinity of Silica from Sugarcane Bagasse Ash (SCBA)**

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Sugarcane bagasse ash (SCBA) is a by-product produced from bagasse burning in sugarcane industry. SCBA contain high concentration of silica as well as aluminum, iron and alkaline earth oxide. In this study, an approach of ash preparation, acid washing and acid leaching have been proposed to extract silica from different concentration of sodium hydroxide, NaOH at 3M and 4M. The microstructure of silica particles were characterized by X-ray diffraction (XRD) and Fourier Transform Infrared Spectroscopy (FTIR). At 1000°C, the peaks for silica quartz appeared at multiple angle compared to that of at 600°C. Moreover, significant intensity level difference was also observed. However, different concentration of sodium hydroxide (NaOH) used for silica extraction had shown insignificant effect on crystallinity level of silica quartz obtained.

**OP-599**

**Nominal Gdp Targeting: A New Framework for Central Bank of Turkey**

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This paper examines the feasibility of Nominal GDP Targeting for Central Bank of Turkey (CBoT) while its heterodox practices are in process and under the government's strong reproof. The paper consists of mainly 3 parts; first the literature review of inflation targeting, then more focus is given to theoretically discuss nominal GDP targeting. The last part aims to give insight to CBoT policies and practices under the different monetary policy approaches. While inflation targeting is carefully assessed as is the current practice of CBOT, the flexible version of it in terms of time horizon adjustment and its further application consideration under nominal GDP targeting are highlighted. As the continuous failure of CBoT in overshooting the price level targets in the past years is underway, the global discussion of nominal GDP targeting may be the the right time for more credibility.

**OP-600**

**Role of The U.S. Economy Driven Innovation Technology And Science Parks Development Of The Country**

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One of the primary factors in the development levels of national societies of the countries that have advanced technologies. Economic development of the countries at the forefront of technological innovation-driven economies in the area, so the index of innovation, R & D expenditure, health, infrastructure and stages of university-industry cooperation in the host countries, such as venture capital because they become successful. Best example of this, the international competitiveness of the U.S. media for its successful high-tech companies in the center of innovations, including a proven track record technoparks, which is Silicon Valley. A large part of the money into the U.S. economy by about 60% of advanced technological innovations and inventions are exhibited and abroad with the power-up in Silicon Valley is important to provide the brain.

**OP-601**

**Adjusting the Strength of Intellectual Property Rights to Allow Healthy Competition**

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The legal protection of a technology by means of patents and other intellectual property rights ("IPRs") gives the right holder the power to exclude its competitors in the market where the products and/or services embodying such technology are diffused. Each supplier in the market faces the uncertainty of whether it can survives the competition. However, IPRs are likely to encourage the right holder to enter the market and become the forerunner, by alleviating such right holder's uncertainty. It is likely that some of the followers, including local entrepreneurs in developing countries, may improve the forerunner's technology and implement such improvements in better products or services. However, it is also probable that the IPRs of the forerunner will inhibit the further advancement of technologies and products or services, by obstructing the activities of the innovative followers in the market. The author assesses the degree of negative impact of the forerunner's IPRs that inhibit any healthy competition between the forerunner and the followers by using a simple network model, which comprises of consumers and competing suppliers. Moreover, based on the analysis using the said network model, the author discusses how we can design an intellectual property law scheme that can restrict the disadvantages caused by IPRs, while maintaining their advantage in encouraging entrepreneurs to enter the market. By means of a discussion using a network model that represents the specific aspects of the market, the author tries to assess the pros and cons of IPRs, especially in the markets of developing countries. The discussion suggests that the strength of IPRs should be adjusted to allow healthy competition between the forerunner and followers in order to give a reasonable degree of benefit to consumers.



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**POSTER PRESENTATIONS**

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PP-001

**Measuring the Contagion Across Hedge Fund Industry**

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The aim of this research is to study the impact of financial crisis on hedge funds and to detect the presence of the effect of contagion in this industry. We choose a Markov Switching-Regime Regression model (MSR) to measure the dynamic risk exposures of hedge funds to different risk factors during different market volatility conditions. We perceive that hedge fund exposure depends on the equity market (S&P 500) is the up-state, which is characterized by both low volatility market and high returns or down-state, which is also characterized by both high volatility market and low returns. Furthermore, by exploring the possibility of all hedge fund strategies in high volatility regime simultaneously, we deem it as strong evidence of the presence of contagion among different hedge fund strategies. Based in our sample, the Long-Term Management (LTCM) crisis of August 1998 precipitated contagion across the hedge fund industry. These results were only generated by this crisis. Other crises including the recent subprime mortgage crisis of August 2007 and the recent global financial crisis of September 2008 have affected hedge funds and did not cause contagion among hedge funds.

PP-002

**The Effects of Managerial and Corporate Applications on Employees by the Mediating Roles of Empowerment and Intrapreneurship**

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In the institutions, knowledge management (KM) and quality management (QM) have organizational outcomes in addition to the positive impacts on human resources of the companies. By KM and QM managerial techniques and institutional infrastructural tools (IIT) create an entrepreneurial organizational environment and effectiveness. The aim of this study is to understand the differences in public and private sectors in Turkey, in terms of the employee performance perception and organizational effectiveness of IIT with the mediating role of lean intrapreneurship (LI). In this study we discuss the effects of these IIT on the employee performance and organizational effectiveness with the mediating role of lean intrapreneurship. Lean intrapreneurship is defined as depending on the information gathered from the customers with a humanitarian view, the methodology of developing effective new business processes, goods and services with minimum resources simply and fastly (Ries, 2011). This methodology consists of three steps which are establishment, measurement and learning. The difference between entrepreneurship and lean start-up is the customer focus in the second one. Because lean start-up is based on the customers' views about the development of the business processes. According to Ries "lean" word comes from the Toyota Production System. This means to separate the valuable processes from the waste ones. On the other hand, lean start up idea is different as referring itself to the innovation concept on its own (Ries and Euchner, 2013). A printed questionnaire was created to collect data associated with the variables in the research. A total of 585 questionnaires were collected from Istanbul. In measuring the "Lean Intrapreneurship", Ries (2011), Erdem and others' (2011) inventories are used. IIT have directly influence the organizational effectiveness and indirectly LI also has a mediating role in this process. But all these influences are less in public sector than private sector in Turkey.

PP-003

**Effects of Instructional Curriculum Based on Cooperative Learning on Secondary School Students' Scientific Process Skills**

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In the study, it was aimed to analyse the effects of instructional curriculum based on cooperative learning for the 7th grade Science and Technology lesson's

subjects of "Structure and Properties of Matter", "Sequence of Electron and Chemical Properties", "Chemical Bonds", "Compounds and Their Formulas", "Mixtures" on student's scientific processing skills. The study, which was done through a semi-experimental design with a pretest-posttest control group, had been conducted with eighty nine 7th grade students who attending at a Secondary School in İstanbul in 2013-2014 academic year. In the experimental group, the subjects topics under the Unit of "Structure and Properties of Matter" was taught with the instructional curriculum based on cooperative learning which was developed by the researchers and in the control group these subjects were covered by using 7th grade Science and Technology Curriculum which was approved by the Board of Education and Discipline and used in that academic year. The learning process lasted for four and a half weeks- 4 lesson time (1 lesson time= 40 minutes) per week. As data collection tool, "Scientific Processing Skills Test" which had been developed by Okey et al. (1982) and adapted to Turkish by Geban et al. (1992) was implemented before and after the instruction in both groups. Wilcoxon Signed Rank test results showed that while there were significant difference between mean scores of experimental group before and after instruction, there were no significant difference between mean scores of control group. This reflected that Cooperative Learning Instructional Curriculum was highly effective on increasing students' scientific processing skills when compared to the existing Science and Technology Curriculum.

PP-004

**Sustainable Development via Social Responsibility Project: "The Youth are Looking to the Future with Confidence"**

*Senem Demirkran*

*Trakya University*

The sustainable development notion, which has dimensions such as social, ecological, economical and spatial, has a societal impact by its results. The primary element constituting the society is the family, so the concept of family has a direct relation with sustainable development in terms of socio-economical basis. The distinct level of development among countries assigns the developmental policies of the countries aimed at the families. In this research, for the aim of fight against poverty, education and protection aimed at families and children, the project which has been applied "ÇOGEP for Safe Life and Safer Future (Social Protection and Support Programme for Kids and the Youth)" prepared related to the project "supporting the roles of major groups within social and economical dimensions" applied in 81 provinces of Turkey aimed for "removing the poor children and youths from bad habits, making them own a job through vocational education, motivating them for success in their school process, socializing and making them do sports and developing them in terms of social and cultural ways" together with ten associates and by the Keşan District Police Headquarters in the province of Edirne, will be examined both theoretically and empirically, and the results will be diagnosed in terms of sustainable development.

PP-005

**Gender as a Determinant of Entrepreneurial Self-Efficacy: Case of Tunisians Entrepreneurs**

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The concept of entrepreneurial self-efficacy knows a considerable development in entrepreneurship. Its importance is bound to the role which it plays in the development of certain entrepreneurial actions. Regarding its importance and the basis of the theory of entrepreneurial self-efficacy, this study tends to verify if the gender constitutes a determinant of entrepreneurial self-efficacy in Tunisian context.

PP-006

**An Analysis on the Relationship between Teacher Candidates' Characteristics of Social Entrepreneurship and Their Level of Academic Risk Taking**

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Social entrepreneurship is a concept that emphasizes both the economical characteristics of entrepreneurship and the social responsibility aspect of it. This concept is defined as a process which involves using the sources in an innovative way so as to make social change possible, create social values or satisfy social needs. In this sense, in the programs developed by Ministry of Education in 2006, it was emphasized that teachers should have such qualities as self-confidence, critical thinking ability, and problem solving skills. This study aims to analyze the relationship between teacher candidates' characteristics of social entrepreneurship and their level of academic risk taking. In this study quantitative research method and relational screening model were used. As the tool of data collection, 1. The Scale of Characteristics of Social Entrepreneurship which was developed by Konaklı and Göğüş (2013) was used. The scale is made up of 21 items and 3 factors. These factors were named as risk taking, self-confidence, and self-creativity. 2. The Scale of Academic Risk Taking which was developed by Clifford (1991) and adapted to Turkish by Korkmaz (2002) was used. The scale is made up of 36 items. The sample of the study is made up of Primary School Science teacher candidates who study at the Faculty of Education. SPSS 20.0 program, ANOVA and Pearson's Method of Product Moment Correlation Coefficient Analysis were used for data analysis. As a result of data analysis, teacher candidates' level of social entrepreneurship was found to be high and their level of academic risk taking was found to be intermediate. Along with this, self-confidence was found to be at a higher level than the other characteristics of social entrepreneurship. There was found to be a meaningful and positive correlation between the characteristics of social entrepreneurship and their level of academic risk taking.

PP-007

**An Evaluation of Science Teacher Candidates' Self-Sufficiency Perception on Information and Communication Technologies in Terms of Certain Demographic Variables**

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Bandura (1977) stated that self-sufficiency perception increases an individual's strength to deal with and resist difficulties while doing a task besides affecting his motivation, initiative and success in a positive way. Today it is very important to teach concepts accurately by making use of information and communication technologies in science education that mostly involves abstract concepts. The aim of this study is to evaluate the self-sufficiency perception of teacher candidates who study at the Department of Primary School Teaching, Science Education at the Faculty of Education on information and communication technologies in terms of certain demographic variables. For this purpose, answers were searched for the questions of 1. What is the level of Science teacher candidates' self-sufficiency perception on information and communication technologies? 2. Does the level of Science teacher candidates' self-sufficiency perception on information and communication technologies differ according to certain demographic variables? In this study, quantitative research method and relational screening model were used. As the tool of data collection, the Scale of Self-Sufficiency Perception on Information and Communication which was developed by Taşkın-Ekici ve Kara (2012) was used. The sample of the study is made up of Science teacher candidates.. SPSS 20 Package program and ANOVA were used for data analysis. As a result of data analysis, the level of Science teacher candidates' self-sufficiency perception on information and communication technologies was found to be high. No significant difference was found between the level of Science teacher candidates' self-sufficiency perception on information and communication technologies, and their grades

and the type of high school they graduated from; significant differences were found in terms of daily and annual use of information and communication technologies, and mother's and father's use of information and communication technologies.

PP-008

**Orientation and Mobility for People with Visual Impairment**

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Orientation & Mobility is a developing field for people with visual impairment that focuses on helping them to be integrated into the daily life. O&M can be defined as bringing a person with visual impairment the ability of travelling alone or with a guide (human guide or guide dog) to travel safely, efficiently and independently in their environment. The main purpose of this field is assisting people with visual impairment learn the routes which are being used frequently by them including public transportation opportunities. One of the main reasons of most developed countries spends money to educate O&M Specialists is that there are some specific rules (or skills) of approaching and travelling with a visually impaired person. Not only, Q & M specialists need to know these rules, but also each citizen should understand and apply basic and main Q & M rules. By this way, the inclusion of people with visual impairment into social life can be increased. The presentation will provide essential information about how Q & M can be defined and implement when addressing its issues and improper practices. The poster will include some pictures to demonstrate the first communication with a visually impaired person that someone can encounter in daily life. At the very end, the presenter(s) will inform the others about the new technological improvements on O&M field; examples for implementing Q & M will be used. Specific recommendations about Q & M for people with visual impairment will be provided. Resources will be shared.

PP-009

**Women Enterpreneurs in Kosovo**

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The entrepreneurship has no long history of the activity in Kosovo. This activity has started during the second half of last century, mainly with small businesses. During the eighties, the private business got a new strength, more rapid in all sectors. The number of businesswoman during this period of time has been very low. This was due to inability for starting a private business as well as due to the lack of sufficient experience in this sector. During the nineties, the private entrepreneurship, both for man and woman has been brought to minimum due to a inconvenient situation for developing a business. Even the small number of private businessman or businesswoman who was doing business did not have an appropriate legality from the Serbian regime installed in the economy of Kosovo then. A lot of people became jobless as a consequence of massive violent termination of the employment in the social sector by Serbian regime; therefore they were forced to work "illegally". The number of businesswoman registered in the government institutions during the nineties was very low, while after the year 2000, they started to work as entrepreneurs in a regular way, in a full compliance with the legislation of the Republic of Kosovo. This number is rapidly increasing as a result of the aid extended from different international organizations as well as different donors, through financial aid or the professional training provided for them. Despite that the profit of businesswoman is rather low, they have still partiality to create a better life for them and their families, employing an appropriate number of workers, mainly family members and relatives.

PP-010

**A Research on Determining the Inclination Towards Entrepreneurship of Banking and Finance Students: Giresun University Example**

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Entrepreneur has an important role in the development and growth. In recent years, it is drawn attention to the importance of young entrepreneurs in development and economic growth. For that reason the studies to investigate relationships between young entrepreneur candidates' entrepreneurship intention and personal characteristics which consist of entrepreneur personality characteristics and selfprofile factors and also their psychological, demographical and family factors which are effective in entrepreneurialism trainings is becoming increasingly come into prominence.

In our country, demographic structure of the population is relatively young. Therefore, studies analyzing the inclination towards young entrepreneurship can develop the literature and also help to shape the entrepreneurship courses, trainings or other policy mechanisms.

This study was conducted with the intend of determining whether or not the students at Giresun University of Görele Applied Sciences School of Banking and Finance department have an entrepreneurial personality and identifying their psychological, demographical and family factors which are effective in entrepreneurialism trainings. With this aim, a questionnaire was made on the students of the Department of Banking and Finance students at Görele School of Applied Sciences. The relationships between students' self perception of having an entrepreneurial personality and their psychological, demographical and family factors which are effective on themselves will to establish a business in the future is revealed.

PP-011

**The Building of the Collaborative Valuation System for Evaluating the R&D Outcomes Invented From the Public Sectors to Promote Technology Transfers**

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The R&D driven in the public sectors has been mostly different from that in the private sectors. The public R&D technologies through the investment of government R&D costs have been mainly invented in the situation which the demand on market exist immediately or in the case that demand of market does not exist immediately even though there will be bigger expected effects within the medium and long-term rather than that of existing the capability to create new demand soon and that it is high technology which will be necessary to invest a lot of money in the market. Therefore it is a limited solution to valueate these outcomes of public R&D based on the existing technology valuation methods because these methods usually estimate business value through company which can sell the some products or services during the product life cycle in related market. This means that it should be the market to make sales by companies and R&D technologies immediately should make the markets which can obtain the sales of companies. In comparison with the private sector, entities that invent and manage the public R&D technologies are bound to be vulnerable to attack of NPEs. In case of companies which prepared completely the strategies which prevent damage and increase revenue, they are actively involved in transfer of their technology right, also active in the course of its valuation, and strategically deal with it. In contrast, entities that manage the R&D technologies from public sector do not have a final goal for creation of revenue. Therefore, In this paper, we proposed to establish the collaboration system of technology valuation based on openness to improve the level of innovation through inter-organizations cooperation which are government institutes to invent necessary technologies in various sectors such as IT, BT, NT and CT.

PP-012

**Investment in Fixed Broadband Networks and Access Regulation in Developed and Developing Countries: Panel Data Applications**

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Since the USA Telecommunications Act of 1996, the regulatory frameworks, have led to the requirement of different policy practices in many countries across the world in order to establish sustainable competition in whole telecommunication markets. These regulatory reforms are the privatization of the telecom historical integrated monopoly (the incumbent), the independency of the regulatory authority, the obligation of transparency of the access price and agreements & the unbundling, the separation and the access pricing policies. This paper suggests an empirical investigation on both the individual, and the global impacts of these different regulatory policy practices on broadband deployment. To this end, we construct a panel data covering 107 developed and developing countries over the period of eight years from 2004 to 2011. Using the Instrumental variables (IV) & the Generalized Method of Moments (GMM) with fixed effects and robust to heteroskedastic and autocorrelated errors, we show that the relationship between regulation and broadband investment is an inverted U shape in developed world while it takes a U form in developing countries. This means that in developed countries, a less restrictive regulatory policy spurs broadband deployment while more stringent policy discourages innovation in telecom industry. However, in the developing countries, the regulation has a strict negative impact on broadband deployment.

PP-013

**Measuring Service Quality and Patient Satisfaction in Health Care Facilities**

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In today's highly competitive environment it is important for any business entity to be able to responsibly manage their performance. One of the important problems of modern management becomes performance management of health facilities. The performance is seen as a comprehensive system of financial and non-financial indicator among which a progressive interaction runs. Financial indicators provide in particular an insight into the past, non-financial indicators have the ability to terminate the perspectives of medical equipment. In the present contribution we focus particular attention on the measurement of non-financial indicators, which are included in the measurement of service quality and patient satisfaction.. Quality of health care is an important part of maintaining an effective model of health care. Therefore, it is expected that not only doctors treat their patients, but also play an important role in the prevention and patient education to a healthy lifestyle. If the objective is to improve the quality of health care, continuously must run the assessment of patients. It is necessary to determine how patients perceive the various dimensions of the service provided. Experience of patients may thus serve as a basis for improving the quality of health care services (Morrow et al 2010). Patient satisfaction is an important indicator in evaluating the quality of national health care (and Sajid Baig 2007). Identification of factors leading to increased patient satisfaction can also help managers in their efforts to improve existing health services.

PP-014

**Importance of Innovation in Insurance Markets of Emerging Countries**

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According to their descriptions, these two words innovation and emerging markets are so rarely for being together. The main reason is because innovation need time, at least middle term unfortunately these time and necessary financial sources could be allocated to innovative actions in emerging markets. However, added value provided by innovation and also its acceleration affect are inalienable for every business in our century.

The first indicator, we need to consider, is main aim of a developing country. A developing country wants to upgrade itself among developed countries. It needs increasing its GDP, providing a fair distribution of wealth among its citizens, having a well-regulated and enough structured financial markets, being one of the most preferred country for international investors and giving its best to people who are living in this country. The unique way for making real these dreams is just innovation. If we restrict our macro view and we just think about our core interest, about insurance sector, we will see main requirements of our insurance sector for being one of the best insurance markets around world. First of all, main issues of our insurance market is taking enough share from investors among international insurance market, having enough insurance penetration in nationwide and making validate the basic rule of insurance markets "law of large numbers". An increasing penetration provides a growing fund to the country. If we leave considering the positive social effect of insurance sector later, this fund affects the country's financial markets positively. Today, all insurance professionals are like-minded that a country cannot realize these targets without innovation.

PP-015

**Canadian Micro-Finance Activity: An Investigation of Model Differences**

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The formation of new institutions –ones with a primary social purpose– is changing the landscape of the current economy. Social entrepreneurs develop innovative models to help marginalized communities, all in a self-sustaining manner. An example of such innovative models can be seen in micro-finance institutions (MFIs), which offer access to financial services to the poor, who are generally excluded from the traditional banking system. These institutions are built and designed to solve social problems, while at the same time seizing entrepreneurial opportunities.

Some of the notable difficulties faced by such institutions are monitoring progress and measuring repayment. This paper investigates five institutions engaging in micro-finance activity across Canada. Particular attention is paid to the models they employ to help entrepreneurs in Canada (both in terms of delivery and structure) and also the results they report. In light of these difficulties, academics and practitioners are encouraged to test, pilot, and ultimately design customer management software to help track progress and measure repayment. This will indeed play a critical role for improving efficiency and accuracy in the sector.

PP-016

**Environmentally Desirable Synthesis of  $\beta$ -aryl- $\alpha$ -Thiolacrylic Acids by Cleavage of 5-Arylidene Rhodanine Under Microwave Irradiation and Solvent Free**

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One of main problems in chemical industry is the search for tolerable procedures for chemical production. There is a growing demand in development of selective, efficient and environmentally appropriate synthetic methods. Organic solvents are not only expensive, but are flammable, toxic and hazardous. Generally the use of solvents considered to be necessary in organic reactions.

Solvent-free methods are especially adapted to organic synthesis under Green Chemistry conditions. When coupled to microwave (MW) irradiation, it results in very efficient and clean procedures with noticeable improvements over classical methods.

The founding principles of green chemistry are mainly based on:

1-The removal, if possible of pollutant solvents those does not respect the environment Nowadays, the use of inorganic solid acid catalysts in the dry

reactions (without organic solvent) offers many possibilities in the field of organic synthesis. Indeed they provide a simplification of the experimental protocols an easy recycling and thereby an easily protection of the environment. 2- The improvement in the energy efficiency that affect beneficially the economy and the environment which must be considered and should be minimized by the development of synthetic method.

5-Arylidene-rhodanine are known for diverse biological activities such as antiviral, bactericidal, fungicidal, antitumoral. 1-4 These compounds are also important intermediates in organic synthesis.

The  $\beta$ -aryl- $\alpha$ -thiolacrylic acids are also useful intermediates in the synthesis of numerous products like aminoacids, nitriles,  $\alpha$ -thiolacids and  $\alpha$ -thioacids. 5 Cleavage of arylidene rhodanine in position C5 in basic medium on potassium zirconium phosphate under microwave activation and free solvent is a simple and effective method for the synthesis of  $\beta$ -aryl- $\alpha$ -thiolacrylic acids We report here the Cleavage of arylidene-rhodanine (Scheme 1).

The reaction is rapid and the yields are generally excellent.

PP-017

**Synthesis, Antibacterial, Theoretical Study and Structure-Activity Relation of Novel Quinoxaline Derivatives**

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The synthesis and chemistry of quinoxalines have attracted considerable attention in the past ten years. Some of them exhibit biological activities including anti-viral, anti-bacterial, anti-inflammatory, anti-Protozoal, anti-cancer (colon cancer therapies), they are also used in the agricultural field as fungicides, herbicides, and insecticides. Also, quinoxaline moieties are present in the structure of various antibiotics such as echinomycin, levomycin and actinoleutin. In addition, quinoxaline derivatives have also found applications in dyes, efficient electron luminescent materials, and organic semiconductors. In view of these observations and in continuation of our research in this field, it was of interest to synthesize certain new quinoxaline analogues to be evaluated for antibacterial activity. We have interested in the preparation of new molecules containing this motif by changing the functionality of our substrate. The biological evaluation was carried out by antibacterial and antifungal tests using different bacterial strains. We have used gram(+) and gram(-) bacterial strains (Salmonella, Klebsiella, Morganella, Staphylococcus). The structural and electronic properties of 2-hydroxyquinoxaline and all of its possible tautomer's have been investigated by the application of MM2, MMFF94, AM1, PM3 DFT type quantum chemical calculations. The vibrational frequencies have been precisely assigned and analyzed and the theoretical results are compared with the experimental vibrations. The structure-activity relationship of the compound is also investigated.

PP-018

**Drug Delivery System Based on Cross-Linked Cyclodextrin and Its Inclusion Complex: Application in Controlled Release of Diclofenac Sodium**

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The main function of drug delivery systems is to transport various drugs to the target sites in the body in a secure way and adjust the release mechanisms by controlling the amount of drugs and treatment time. There are several carriers and formulations used for drug delivery purposes such as polymeric matrices, gels, cyclodextrins, microspheres, films and some others. In drug delivery, it is expected from a carrier material to have at least following properties; biocompatibility, non-toxicity, lack of immunogenicity, acceptable biodegradation time and continuous activation until arrival to the target. cyclodextrins (CD) present significant opportunities in drug delivery

systems with their unique and promising characteristic features. They induce improvement in drug release profiles and enhancement in drug solubilization and stabilization by forming inclusion complexes with drugs. The present work focuses on the approaches tested to synthesize cross-linked  $\beta$ -cyclodextrin ( $\beta$ -CDP) as drug carrier for diclofenac sodium (DFCNa), a non-steroidal anti-inflammatory agent. The synthesis was performed by polycondensation using citric acid as a crosslinking agent; sodium dihydrogen phosphate as a catalyst and polyvinylalcohol as a modifier. The FTIR spectra revealed that the hydroxyl groups of  $\beta$ -CD are cross-linked by the carboxyls of citric acid and at the same time the characteristics of the structure of  $\beta$ -CD were well retained in the biomaterial. Then, the co-precipitate mixtures  $\beta$ -CD and or  $\beta$ -CDP/DFCNa, with different molar ratio, were prepared. Binary systems were characterized by FTIR spectroscopy and X-ray diffractometry. In vitro release properties of DFCNa have been investigated in simulated gastric fluid (pH=1.2) at  $37\pm 0.5^\circ\text{C}$ . The kinetics of dissolution of the active ingredient, from the inclusion complex of  $\beta$ -CD in acidic medium, showed that the delivery is reduced with  $\beta$ -CDP, so crosslinking is favored for the controlled release.

PP-019

**Removal of Biebrich Scarlet (BS) by Uncalcined and Calcined MgNiAl Layered Double Hydroxides From Aqueous Solution**

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Uncalcined (MgNiAl-CO<sub>3</sub>) and calcined (MgNiAl-C) hydrotalcites were used in the removal of the anionic day acid red 66 (Biebrich Scarlet (BS)) from aqueous solution in a batch mode. In the first, the obtained materials were characterized by XRD, nitrogen adsorption isotherm, pore structural analysis and Fourier transform infrared spectroscopy. Adsorption studies were performed and the effects of various experimental parameters such as time, solution pH and concentration of BS were evaluated. The fitted of kinetic experimental values to the pseudo-first and pseudo-second order models show that the adsorption of BS on MgNiAl-C follows closely the pseudo-second order model. Equilibrium adsorption isotherms were analyzed by the Langmuir, and Freundlich models. It was found that Langmuir model gives a better fit than the other and showing maximum monolayer adsorption capacity of 637 mg/g for calcined MgNiAl-C which is in accordance with the experimental value.

PP-020

**The Batch Adsorption of Caffeine Onto Modified Natural Bentonite**

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Adsorption of the caffeine from aqueous solution onto the surface of modified natural bentonite was investigated spectrophotometrically. Modification of the natural bentonite was exchanged with a set of 2 alkyltrimethylammonium bromides (C16 and C18). Brunauer Emmett Teller (BET), X-ray diffraction (XRD) and Fourier transformed infrared spectroscopy (FTIR) analysis were carried out on both clays. The surface areas of organo-bentonites were found to be much lower than that of natural bentonite. In this study, we studied how the key operational parameters: contact time, dye concentration and pH could affect the adsorption performance for the removal of caffeine. The removal of caffeine was independent of pH changes. The equilibrium data were evaluated using the Langmuir, Freundlich and Toth isotherms. The adsorption kinetics was best described by the pseudo-second order model.

PP-021

**Synthesis of Termosensitive Cellulose Nanofibers from Cellulose Fibril**

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Biopolymers such as cellulose, chitosan and collagen from renewable resources have become increasingly important in the development of smart materials. Cellulose derivatives are used for coatings, laminates, optical films, pharmaceuticals, foods, and textiles. In this study, methylol groups of cellulose molecule, react with Ce(IV) in redox reaction yielding radicals. By the reaction of these radicals with hydrophilic monomers such as N-isopropylacrylamide, sodium vinylbenzene sulphonate; and with hydrophobic vinyl monomers such as styrene, t-butyl metacrylate were polymerized with cellulose. The modified cellulose nanofibers were structurally characterized by FT-IR, SEM, TEM. Light microscopy were used to analyse for thermal behavior of the modified cellulose nanofibers at different temperatures. The results were compared with unmodified cellulose fibril.

PP-022

**Removal of Hazardous Azo Dye Reactive Black 5 From Aqueous Solution by Cross-Linked Magnetic Biosorbent; Equilibrium and Kinetic Studies**

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In this study, chitosan was cross-linked using glutaraldehyde in the presence of magnetite. The resin obtained was chemically modified through the reaction with glutaraldehyde. The uptake of Reactive Black 5 (RB5) from aqueous solutions using glutaraldehyde cross-linked magnetic chitosan nanoparticles (GMCNs) at 25°C. The GMCNs exhibited significantly higher adsorption capacities of the RB 5 from aqueous solutions. The characterization of the GMCNs was performed by fourier transform infrared spectroscopy, transmission electron microscopy, scanning electron microscopy, dynamic light scattering, and vibrating sample magnetometry analyses. Adsorption characteristics of the RB 5 from aqueous solution on to GMCNs have been studied and results indicated that the adsorption capacities were affected by initial pH values, initial dye concentrations, contact time and adsorbent dose. Adsorptions by the adsorbents under investigation follow the Freundlich, Langmuir and Dubinnin-Radushkevich isotherm models. Meanwhile kinetics parameters of the process were estimated. The nanoparticles for the adsorption of the dyes were regenerated efficiently through the alkaline solution and were then reused for dye removal.

PP-023

**Polymerization of Pyrrole with Ce(IV) Oxidic Dibenzoate**

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Polypyrrole was synthesized via chemical oxidative polymerization of pyrrole (Py) in the presence of cerium (IV) oxidic dibenzoate (CODB). The treatment of Py with CODB was maintained in non-aqueous media for one hour at room temperature. Several solvents including toluene, dichloromethane, N,N-dimethyl formamide, N,N-dimethyl acetamide, acetonitrile and ethyl acetate were used. Besides the role of reaction media, the effect of ceric (IV) oxidic compound on polymerization was investigated. Reactions with constant amount of Py, and CODB to Py mol ratios of 0.33:1.0, 0.5:1.0 and 1.0:1.0 were observed. The results showed that in one-hour limited time, polypyrrole could be obtained in toluene, dichloromethane and acetonitrile with CODB: Py mol ratios of 0.5: 1.0 and 1.0: 1.0, and the longer reaction time were required in the case of 0.33:1.0. Increase in the amount of oxidant resulted in increase of the



yield of the product. Conductivities of polypyrroles were determined by 4-point probe technique. Polypyrroles with conductivities of  $\sim 10^{-2}$  S/cm and  $\sim 1$  S/cm were prepared in dichloromethane and toluene, respectively.

**PP-024**

**Effect of the Addition of Additives on the Improvement of the Performance of Lead-Acid Batteries**

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The objective of this work is to improve the electrical properties of lead-acid battery with the addition of additives in electrolyte and in the cured plates before oxidation. The results showed that the addition of surfactant in sulfuric acid and 3% mineral additive in the cured plates change the morphology and the crystallite size of PAM after oxidation. The discharge capacity increases with the decrease of the crystallite size and the resistance of the active mass. This shows that the addition of mineral additive and the surfactant additive to the PAM, the electrical performance and the cycle life of lead-acid battery are significantly increases.

**PP-025**

**Competitive Adsorption of Dye Metanil Yellow and Reactive Black 5 in Aqueous Solution by Cross-Linked Magnetic Biosorbent; Equilibrium and Kinetic studies**

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In this study, chitosan was cross-linked using glutaraldehyde in the presence of magnetite. The resin obtained was chemically modified through the reaction with glutaraldehyde. A batch system was applied to study the adsorption behavior of one reactive dye (Reactive Black 5, RB5) and one acid dye (Metanil Yellow, MY) in aqueous solutions using glutaraldehyde cross-linked magnetic chitosan nanoparticles (GMCNs) at 25°C. The GMCNs exhibited significantly higher adsorption capacities of the dye mixture from aqueous solutions. The characterization of the GMCNs was performed by fourier transform infrared spectroscopy, transmission electron microscopy, scanning electron microscopy, dynamic light scattering, and vibrating sample magnetometry analyses. Adsorption characteristics of the dye mixture from aqueous solution on to GMCNs have been studied and results indicated that the adsorption capacities were affected by initial pH values, initial dye concentrations, contact time and adsorbent dose. Adsorptions by the adsorbents under investigation follow the Freundlich, Langmuir and Dubinin-Radushkevich isotherm models. Mean while kinetics parameters of the process were estimated. The nanoparticles for the adsorption of the dyes were regenerated efficiently through the alkaline solution and were then reused for dye mixture removal.

**PP-026**

**Thermodynamics Approach in the Adsorption of Heavy Metal Pollutants on Specific Polymers\***

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One of the most serious environmental problems is the existence of hazardous and toxic pollutants (heavy metals etc.) in industrial wastewaters. Heavy metals are metabolic poisons and enzyme inhibitors (L. Nordberg et al., 1979). They can cause mental retardation and semipermanent brain damage. Most of the point sources of heavy metal pollutants are industrial wastewater from mining, metal processing, pharmaceuticals, tanneries,

organic chemicals, pesticides, rubber and plastics. Heavy metals are persistent environmental contaminants, because they cannot be rendered harmless by chemical or biological remediation processes (Devi, M et al., 1995). Therefore, industrial wastewaters containing toxic heavy metals need to be treated before being released into the environment.

Among the various techniques, adsorption, an effective method due to its efficiency and simplicity of applicability, is widely used in the removal of contaminants from industrial wastewaters.

Polymeric adsorbents in different forms (micro- and nanospheres, etc.) are used very often in recent years for their economical advantages, high efficiency, easy handling, presence of difference, and reusability. There have been several studies for the removal of heavy metal ions etc. from wastewater, using different polymeric adsorbents (Kara A. et al., 2004,2006,2012,2014). In this study, various specific polymers were synthesized and characterized To show that the polymeric adsorbents can be used directly for the adsorption of various heavy metal ions from aqueous solutions, adsorption experiments were conducted at various pH, temperatures, times, and concentrations. To clarify the adsorption process, adsorption isotherms and kinetic studies were also conducted and thermodynamic parameters were calculated.

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**PP-027**

**Value Chain and Market Analysis by Various Application in Epoxy Resin Industry**

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Epoxy resins, also known as polyepoxides, have a wide range of industrial applications: metal coatings, electronic or electrical component use, high tension electrical insulators, fibre-reinforced plastic materials, structural adhesives, etc. Epoxy resins have superior physical properties such as adhesiveness, insulation, water-resistant, heat-resistant.

Bisphenol A-type (BPA) is the most general type of epoxy resin and the raw materials are bisphenol A and epichlorohydrin. The major production companies for each materials are as follows: Bayer, SABIC, Mitsui Chemical, Nan Ya (bisphenol A); Dow Chemical, Mementive, Formosa Plastics Corp., Huaili Zheng, Solvay SA (Epichlorohydrin). The main companies for producing epoxy resins are Dow Chemical, Nan Ya, Hexion, Kukdo, Huntsman, Changchun, Aditya Birla. Amount of epoxy resin produced in the world is forecast to reach 6.297 million tons in 2011 from 10.901 million tons in 2016 with 11.6% CAGR (compound annual growth rate). The major application of resin is expected in 2016 to be paint/coating (25%), electrical/electronics (17%), and adhesives (17%). The leading major companies (Dow Chemical, MPM, Nan Ya, Kukdo, and Huntsman) occupies more than 60% of market share. The top 3 Chinese makers are Nan Ya Epoxy Resin, Sanmu Group, and Kingboard Chemical Holdings. Kukdo Chemicals is the top company in Asia, which has about 150,000 ton capacity a year. There is a tendency that epoxy resin market needs eco-environmental as well as safe products, and to develop specialized function for miniaturized electronics, high-tech merchandises, light products: for example, solvent-free epoxy resin-based painting, anticorrosive/antifouling coating for ship, lead-free/halogen-free EMC, infrared/visible light LED package, high-energy LED package.

**PP-028**

**The Investigation of Functional Group Effects in the Biological Antioxidant Activities of 1,2,4-Triazole Derivatives**

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A series of 1,2,4-triazole derivative compounds substituted with groups of phenol and pyridine were synthesized in high yields and screened the total antioxidant activity. The compounds showed better than expected antioxidant activity. Among these, compound G (2-(5-mercapto-4H-1,2,4-triazol-3-yl) phenol) had a high total antioxidant activity potential with value of  $232.12 \pm 6.89$  mmol/mL. Further, The antioxidant potential of heterocyclic compounds that 1,2,4-triazole derivatives containing different functional groups were compared

and has been shown to increase the activity of electron donating groups. Therefore, the present study demonstrates that phenol and pyridine substituted 1,2,4-Triazole compounds would be a better prospective in the development of antioxidant agent.

**PP-029**

**Xanthine Oxidase Inhibition of Ruthenium (II) Complexes Containing Tridentate Triamines**

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Ruthenium complexes are used especially for medicinal and bioinorganic purposes in many different areas. For this purpose investigated possible the enzyme inhibitory effects on xanthine oxidase (XO) of organoruthenium complexes namely, [chloro [N,N'-(2,6-pyridinediyl-κN) diethylidene] bis [benzamine-κN]] [N-(2-pyridinyl-κN) methylene] benzenesulfonamide-κN] ruthenium(II) chloride (Cmplx 1), [chloro [2,2'-(2,6-pyridinediyl-κN) bis [1H-benzimidazole-κN<sup>2</sup>]]N-(2-pyridinyl-κN) methylene] benzenesulfonamide-κN] ruthenium(II) chloride (Cmplx 2), [chloro[2,6-di(1H-pyrazol-3-yl-κN<sup>2</sup>) pyridine-κN] [N-(2-pyridinyl-κN) methylene] [benzenesulfonamide-κN] ruthenium(II) chloride (Cmplx 3). The Cmplx 2 with benzimidazole ligand displayed reasonably higher XO enzyme inhibitory activity (IC<sub>50</sub> = 53.80 ± 2.69 μM) and it was concluded from the test results that organoruthenium complexes showed much better than expected xanthine oxidase inhibition.

**PP-030**

**Synthesized and Characterization of Bi/Nb doped BaTiO<sub>3</sub> Ceramics**

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Barium titanate is one of the most widely preferred ferroelectric materials which have been used in various forms such as bulk, thin, thick films, powder. It has got some property such as high dielectric constant, high polarization constant, low dielectric loss etc. The chemical and dielectric properties of barium titanate can be modified by doping with various cations on both A (Ba) and B (Ti) sites. In this study, the structural feature of Ba<sub>0.5</sub>Bi<sub>0.5</sub>Ti<sub>0.5</sub>Nb<sub>0.5</sub>O<sub>3</sub> by adding Bi<sub>2</sub>O<sub>3</sub> and Nb<sub>2</sub>O<sub>5</sub> to perovskite structure of BaTiO<sub>3</sub> was investigated. The Ba<sub>0.5</sub>Bi<sub>0.5</sub>Ti<sub>0.5</sub>Nb<sub>0.5</sub>O<sub>3</sub> ceramic sample was synthesized using the conventional solid state reaction method in air atmosphere. Bismuth oxide (Bi<sub>2</sub>O<sub>3</sub>, % 99,5 purity, Alfa Aesar), niobium oxide (Nb<sub>2</sub>O<sub>5</sub>, % 99,9 purity, Alfa Aesar), barium carbonate (BaCO<sub>3</sub>, % 98,5 purity, Merck), titanium oxide (TiO<sub>2</sub>, % 99,9 purity, Merck) powders were mixed in stoichiometric proportions and grounded with acetone using ultrasound device. After homogenization, the slurry was dried in an oven at 150 °C for a day. The dried sample was calcined at 1100 °C for 4h in air atmosphere. X-ray diffraction (XRD) analyses were carried out by Rigaku diffractometer using Cu Kα radiation (λ=1,540546 Å) in the angle range 0° < 2θ <= 90° with 3s counting time for each step of 0,05°. The microstructure of the calcined sample was observed by scanning electron microscope JEOL-JSM 5500 equipped with an energy dispersive X-ray (EDX) detector. The results showed that synthesized sample had high purity and homogenous tetragonal structure. The average particle size 't' calculated as 53,02 nm using Debye Scherer method from the XRD patterns.

**PP-031**

**Magnetically Removing Phenols from Aqueous Solutions with Nano-Biosorbent: Equilibrium and a Kinetic Approach**

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The efficiencies of removal of phenol, 2-chlorophenol, and 4-chlorophenol from aqueous solution with magnetic chitosan nanoparticles were investigated in this work. Chitosan-coated magnetite nanoparticles were successfully synthesized, characterized and applied as an effective magnetic biosorbent for the removal of phenol, 2-chlorophenol, and 4-chlorophenol from aqueous solutions. The characterization of synthesized magnetic chitosan nanoparticles was performed by fourier transform infrared spectroscopy, transmission electron microscopy, scanning electron microscopy, dynamic light scattering, and vibrating sample magnetometry analyses. Adsorption characteristics of phenolic compounds from aqueous solution on to magnetic chitosan have been studied and results indicated that the adsorption capacities were affected by initial pH values, initial concentration of adsorbates, dosage of adsorbent and contact time. The adsorption of adsorbates followed with the pseudo-second-order reaction, and equilibrium experiments were well fitted the Freundlich isotherm model. Furthermore, it was found that the magnetic biosorbent can be regenerated and reused for five repeated cycles for the removal of phenol, 2-CPh, and 4-CPh and avoided secondary pollution of biosorbent to water.

**PP-032**

**Synthesis, Characterization and Application of Silica-Coated Magnetic Nanoparticles Modified with N-methyl-D-glucamine for the Removal of Boron from Seawater**

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Boron is an essential micronutrient for plants and animals as well as a useful component for numerous industries. The World Health Organisation (WHO) recommends maximum concentration limit of boron as 0.5 mg/L for drinking water. It is reported that, this limit is rarely reached for conventional reverse osmosis desalination plants equipped with commercially available membranes. The associated boron problem with the seawater reverse osmosis desalination process had been detected clearly during the last few years. Seawater contains an average of 4.6 ppm boron, but ranges from 0.5 to 9.6 ppm. The rejection of boron by RO is not sufficiently high, so about one third of boron content (~1.5 mg/L) is normally found in the produced permeate. As for irrigation water, boron is required for certain metabolic activities in plants. However, higher boron levels accelerate plants decay and expiration. Therefore, more efficient separation technologies are needed for boron removal. In this study, silica-coated magnetic nanoparticles modified with N-methyl-D-glucamine (NMDG) were synthesized by a sol-gel method. These magnetic nanoparticles were assessed as a new solid phase extractant for extraction of boron from aqueous solutions. The crystal and chemical structures and magnetic property of the new extractant were characterized by X-ray diffraction (XRD), transmission electron microscopy (TEM), Fourier transform infrared spectrophotometer (FT-IR), and vibration sample magnetometer (VSM). The synthesized extractant was applied to extraction of boron from seawater. The influence of different parameters on the extractant capacity, magnetic extractant dosage, pH, equilibrium time, type and amount of stripping solution, were evaluated by using the magnetic extractant.

PP-033

**Magnetically Removing Phenols from Aqueous Solutions Using Dendronized Magnetic Chitosan as a Biopolymer: Optimization, Kinetic, and Isotherm Studies**

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Dendronized Magnetic Chitosan (DMCS) was prepared to improve the adsorption capacity of chitosan (CS) for efficient removal of phenol, 2-chlorophenol, and 4-chlorophenol from aqueous solution. Preparation of a magnetic biopolymer DMCS as a biocompatible adsorbent and its phenols removal potential were performed. Chemical specifications of DMCS were determined using Fourier transform infrared. The surface morphology of the DMCS surface was characterized by scanning electron microscopy. Results confirmed that the linkages between the NH<sub>2</sub> groups of dendron and carboxylic groups of modified Chitosan were accomplished chemically. A response surface methodology was applied to estimate the simple and combined effects of the operating variables, including pH, dye concentration, and time contact. Furthermore, the isotherm and kinetic models of phenols adsorption were performed.

PP-034

**Determination of Antioxidant Activity in Broad-leaf Dock (*Rumex obtusifolius*) Plant**

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Antioxidants are substances that, when present in food or in the body at very low concentrations, delay, control, or prevent oxidative processes leading to initiation and propagation of degenerative diseases in the body. Higher plants provide a rich source of natural antioxidants, such as tocopherols and phenols/polyphenols (Zhong & Shahidi, 2015). *Rumex obtusifolius* L. (Polygonaceae) is one of the most common plants that occur in silage fields, on river banks and in ditches. It grows in Northern Ireland, Africa, temperate Asia, and Europe. This perennial and dietary plant has long been used in folklore medicine as an antidote to nettle, depurative, astringent, laxative, and tonic, and in the treatment of sores, blisters, burns, cancer and tumors (Harshaw, Nahar, Vadla, Saif-E-Naser, & Sarker, 2010). In this study, we determined the antioxidant activity of two different solvent fractions (methanol and ethyl acetate) obtained from *Rumex obtusifolius* L. plant leaves by using DPPH radical scavenging activity, Ferrous ion chelating activity and Reducing power activity. Methanol and ethyl acetate extracts of the plant showed similar results for ferrous ion chelating activity and reducing power activity. Considering DPPH radical scavenging results, methanol extract of the plant showed much higher activity than ethylacetate extract. Finally, antioxidant enzyme activity (Superoxide dismutase, Peroxidase, Catalase, Polyphenol oxidase) of the crude extract was measured by using spectrophotometric method.

PP-035

**I Speak program**

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In this fast-paced world, quick and accurate communications are important. Despite the advancement of technology, there is still a communication gap between the deaf and normal people because normal people are not familiar with the sign language and the deaf are unable to hear audible sounds properly. Even though many people tried to bridge that gap by proposing many ideas, there is no available application that educates the deaf how to speak. The common belief among people is the deaf cannot speak. In fact, they do. With their teachers' help in the beginning, they use methods of lip reading and feeling the throat vibration to get the right articulation of the letter origin.

Thus, the 'I Speak' program, is going to educate and train the deaf on how to speak. Firstly, the letter is displayed in front of the students and then the pronunciation is recorded in their voices, then files are to be saved in the database. Second step is the training level. The student is going to speak the letter which will appear using the voice recognition method and Euclidean distance that loads the recorded data and then match both sound files. When they recognize more than one letter, the application will analyze meaningful words with pictures in the learning words category. Furthermore, the application will motivate the students by showing their achievements. Finally, a report of the student's performance will be generated to be sent via email to the teacher and parents. In conclusion, 'I Speak' will help the students to learn the letters and their example words under the supervision of a teacher, improve the field of Special Education and help the deaf to slowly get rid of sign languages. The application will be considered as a technology for enhancing verbal skill of deaf learners.

PP-036

**Evaluation of Water Pollution Generated by Petrochemical Industrial Zone in the Region of Skikda (Algerian East Coasts)**

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This study is a diagnostic on quality of wastewaters discharged by the industrial zone of Skikda, compared with three witnesses in the natural environment. For two consecutive years and regularly, monitoring 10 selected stations and 19 characteristics, have given a total of 4560 analyses. Measurements show a very marked deterioration in residuary waters quality for seven selected complexes, with accentuated chemical and hydrocarbons pollution. The adopted statistical approach allows us to group the studied stations in 5 homogeneous groups, with a similarity level of 96.84 %. This approach provides some information on the industrial activity influence in the Gulf of Skikda on the immediate environment (Oued Saf-Saf and the Mediterranean), with consequences and impacts on environmental quality in the region.

PP-037

**Quantity Results and Evaluation of Mercury Contamination Level of Surface Water of Zit-Emba Dam Wilaya of Skikda, Algerian North East**

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The determination of the origin of the pollution by micro-pollutants of surface waters of the basin discharging in Zit-Emba dam has been addressed using a spatial-temporal exploration of the physical parameters, major Elements and heavy metals from one hand, and the geographic; geological and metal-genic exploration of the area of the study from the other hand. The results of the hydro-chemical study has shown that the waters located in this dam and upstream are contaminated by an urban and an industrial pollution (including DB05 between 20 and 50 mg/l) with a high pollution quality during the low water period. During the high water's period, two sampling stations have shown high values in comparison with the stander St1 and St2 (Hammam Ouled Ali and Bouâti-M~) which classify them between fair and poor quality and a report of DCO/DBO5 higher than 3 which reaches 7, 2 translating that the contribution of the agro-industrial affluent is more or less not readily biodegradable. At the same time, the presence of metal traces elements such as mercury with average which successively changes on the sampling stations: St1, St2, St3, St4 as follows: (0.053 to 0.029 - 0.012 to 0.088 mg / l). For the emergence of the Lead, its contents are important in times of low water which reach a successively averages on the sampling waters of St1 to St4 as follow: the sampling stations St1 to St4 as follows ( from.224 to.222 - .278 to.194 mg / l) but

its evolution in space on the four sampling stations is decreasing. These levels limit the use of this water particularly for drinking water supply (AEP) and have a long-term threat to the health of the population that uses it.

**PP-038**

**Risk Characterization of Irrigation Agricultural Land by Waters of Wadi Bounamoussa (Northeast Algerian)**

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Because of discharges dumped into rivers and watersheds, reflecting the continued activity of Men, the earth receives and absorbs waste that form the groundwater pollution. Urban discharges in wadis raises the thorny question of their impact on the surface water in the plain of Bounamoussa (wilaya of El Tarf, in the far north east of Algeria. In order to know the current state of water quality in the North East region of Algeria, we conducted a study to examine the quality of water and soil agro-system located in plain Bounamoussa the wilaya of El Tarf which is a largely rural area where water resources are heavily used for agricultural activities. The evaluation analysis of soil and water in different observation points has been the subject of a data processing performed during a cycle showed that the waters of the plain of Bounamoussa are of average salinity even strong, generally suitable for the irrigation of salt tolerant crops on well-drained soils, very sensitive to variations in the chemical aspect related to the irrational use of chemical fertilizers. Changes in salinity, however, must be controlled. The use of waters of the Oued Bounamoussa for irrigation of agricultural land, requires the consideration of the health risks associated with the potential presence of toxic chemicals that can degrade the quality of surface waters of the plain. The organic pollution appears as significant due to natural pollution but also exogenous pollution.

This is why it is imperative to pollution susceptibility as agricultural irrigation water from the plain to assess the levels of these chemicals in the soil, in order to truly appreciate the magnitude of the risk and to know the origins of water contamination of the plain as a result of the impact of waters of the Oued Bounamoussa.

**PP-039**

**Characterization of Epoxy polymer composite reinforced with Kenaf fiber**

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Kenaf composites have been widely used for the engineering and industrial applications such as air cleaner, dashboard, insulation mats, fibreboard and etc. Due to considerable attentions, kenaf fibers are reinforced in polymers for the fabrication of polymer composites. This work deals with the fabrication and characterizations of untreated and treated temafa kenaf fibers. The physical, microstructure, and mechanical properties of the prepared kenaf polymer composites were discussed in this study. The kenaf fibers were treated with sodium hydroxide (NaOH) solution having 6 wt% for 24 hours soaking time. The epoxy thermoset reinforced with randomly oriented temafa kenaf was fabricated using compression molding technique. The composite samples of kenaf were prepared with different fiber loadings; 20%, 30%, 40% and 50% in weight. It was found that the properties of kenaf composites mainly depend on the compositions of kenaf fibers. It has also been investigated that the treatment influences the properties of kenaf itself. Overall, the results revealed that the untreated kenaf composites have better mechanical properties such as flexural strength as compared to the treated kenaf composites. However, it is observed that the flexural strength also increases with the increment percentage of kenaf fibers. Finally, these prepared kenaf composites with better physical and mechanical properties may be used for automotive applications.

**PP-040**

**The Exploitation of Techniques with Handover Queuing for Mobile Satellite Networks for Serving Air Traffic Control Communication**

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Low earth orbit (Leo) satellites constellations are important in future air traffic communication because they have a wide earth coverage area, especially oceans and desert places. But due to the satellite motion with respect to the earth's surface and the aircraft's mobility, it is required to handover frequently in the process of communicating, the techniques managing handover are: non priority, priority, and queuing handoff schemes, in this paper we are interested only in schemes that prioritize handover request in particular handoff queuing schemes. For this aim several studies have been performed and the various strategies of priority of the handover have been proposed. Relying on these proposed techniques we will study the handover in the air traffic communication by taking into account the difference between the systems with this studies are done and the future air traffic control (ATC) communication networks based on satellites constellations.

**PP-041**

**Experimental and Numerical Characterization of The Behavior of Algerian Sandy Soils**

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Foundation soils of some civil engineering structures are often consist of sandy layers. It should be, therefore, necessary to study the mechanical behavior of sandy soils to identify their strength and deformation characteristics in order to ensure the stability of these structures under the effect of stresses they support. Laboratory studies provides a theoretical and experimental basis very useful for understanding the deformation mechanism of foundation soils, determine their amplitude and follow their evolution over time, which can prevent these deformations and consequently ensure their stability. The use of numerical methods for analyzing of geotechnical problems requires the implementation of nonlinear models for to better understand their actual behavior. Hyperbolic models are the most frequently used for predicting the behavior of soils in boundary value problems. This study aims to characterize of deformability and failure properties of sand of dunes collected from Boussaâda city (Algeria). The experimental program carried out contains compression triaxial tests performed in drained conditions. The results of numerical response are compared with experimental data. Two models are used; Duncan et al. (1980) model (nonlinear-elastic approach), and Hardening-soil-model (elastic-plastic approach).

**PP-042**

**Experimental Study of Steel Fibre Reinforced Refractory Concrete**

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This research has examined the influence of fibre geometry of stainless steel melt extract fibres on the performance of a proprietary 1400°C medium duty calcium aluminate bonded castable. It has also examined whether it is necessary to obtain flexural and toughness measurements at temperature in order to evaluate the performance of fibre reinforcement or whether it is possible to obtain meaningful results from a much simpler room temperature test. Eleven different melt extract fibres geometries were investigated, with fibre lengths of 10mm, 25mm and 50mm and aspect ratio varying from 14 to 108. Beams specimens reinforced with 5% by weight of steel fibre, were cyclically heated and cooled on one face in a purpose-built spalling resistance furnace

to condition them in a simulated service environment. Flexural tests were conducted at elevated temperature by using a simple insulating box and at room temperature to obtain flexural strengths and toughness indices.

**PP-043**

**Optimization of Machining Instructions “Case of Cutting Parameters”**

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The time of the calculation of cutting parameters has an influence on production costs. The objective of this work is to develop a tool to automate and Optimization the calculation of cutting parameters shooting and milling. Two parties have been developed. The first is devoted to the presentation of existing relationships to calculate the various cutting parameters such as speed cutting and speed up front, speed, diameter and roughness.... The second part deals with the automation of calculating the various cutting parameters.

**PP-044**

**Technology Roadmapping as a Tool of Strategic Management: A Petroleum Refinery Case**

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In industry organizations, there are several tools and methods to support innovations. Technology roadmapping is one of the most widely used practical method to constitute better strategic R&D (research and development) programs and investment plans. Roadmapping technique is vital to survive in changing environments. This paper presents firm level product-technology roadmapping techniques applications in a petroleum refining company which is Turkey's only oil refinery company. The aim of this study was to indicate energy, fuel and refinery sector development directions in the time horizon up to 2040 and identify key technologies to produce critical products. This study integrate modified roadmap structure, modified Delphi method, fast-start workshop method and T-plan process. The first step is to decide the structure of the roadmap to better analyze integration of market, product, technology and sources such as R&D programs and incentive programs in next twenty five years. Second, Delphi survey is conducted with experts and academics to identify key issues for roadmapping. Third, fast start workshops are conducted as a preparation to T-plan process with Finally, the roadmap is develop with respect to T-plan process. The constructed roadmap is a valued and useful tool in company for determination of the market needs, opportunities and threats, the technology that enables the development of appropriate products; identification of technological fields in R&D projects; understanding company's own technological capabilities and the subjects can be studied with these competencies and determination of the sources.

**PP-045**

**The Place of Ready-Made Clothing**

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Some constitutions that can be defined as economic integrations have emerged in order for sectors to put up resistance against the globalization of World economy. These constitutions EU, NAFTA, EFTA are known to be constitutions that aim to earn more with freer and more trade.

Turkey, as a developing country, is struggling to improve ready-made clothing sector with takes place in its domestic industry. Turkey does that simply not to be affected badly by the negative effects of those economic integrations.

In this study, current situation of textile sector in Turkey, its share within the economic development and policies towards it will be examined and its place in the international trade will be analysed.

**PP-046**

**Feed-Forward Neural Network Model for Predicting of Anemia Classification**

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One of the issues that forced most of the physician is not easy to distinguish from each other blood diseases. Anemia and polycythemia are coming the beginning of this blood disease. Anemia is classified in its own seems to consist of three parts. These sections are microcytosis, normocytosis and macrocytosis. Polycythemia is used in an excess of the blood erythrocytes. In this study, we performed an estimation with Feedforward Neural Networks (FNN) to predict diseases and classifications from Complete blood counts of laboratory data (RBC, HGB, HCT, MCV, MCH, iron, RDW, age). Diseases which can be predicted by means of laboratory data; iron deficiency anemia, thalassemia anemia and the anemia of chronic disease. Because of the difficulty to estimate the disease within these data, instead of these diseases, we considered the classifications. These classifications are normocytosis, macrocytosis and polisitemia. As a result of a study, from 158 different blood values, we founded 6 classifications (iron deficiency anemia, thalassemia anemia, anemia of chronic disease, normocytosis, macrocytosis and polycythemia) and diseases, and performance results are presented.

**PP-047**

**Design of the Mothership Which Will Carry Flock of Mini Unmanned Aerial Vehicles (Swarm)**

*Gökhan Gülşen*

Hava Harp Okulu

Recently, Unmanned Aerial Vehicle's(UAV) have been started to be used in civilian and military area. Being chip and having autonomous control system made Unmanned Aerial Vehicles easier to use. Today Unmanned Aerial Vehicles(UAV) are being used on many missions like reconnaissance, surveillance, target acquisition, damage assessment, disposal, monitoring, observation, search and rescue and spraying. For the necessities and the missions of our day, using only one UAV is not sufficient. Having multiple Unmanned Aerial Vehicle (SWARM), the “Bevy” system, we will increase the rate of these needs are met. Flocks of Unmanned Aerial Vehicles which have many options will be replaced with a single UAV use in the near future. By using mothership which will carry swarm safely we will reduce important parameters such as product waste, time and cost of fuel. The mini UAVs which will be controlled autonomously or by remote control system will be able to do multitask. Motherships, which will be designed with the modular autonomic system, will not respond all of the requirements. Motherships will only be used for Cargo transportation. By developing effective and available numerical simulations, we will be able to build an optimal UAV.

**PP-048**

**Synthesis and Characterization of Organophilic Clay Materials for the Removal of Micropollutants: Benzoic Acid & Salicylic Acid in Aqueous Solutions**

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Industrial wastewater contains many contaminating organic and inorganic materials, such as aromatic compounds. Many organic compounds have been classified as hazardous pollutants because of their potential toxicity both to human health and environment. Benzoic acid, as a major kind of chemical preservatives, is one of the most important additives in the food industry. Also, Salicylic acid

is an important intermediate that is widely used in pharmaceutical industry. There are many methods for the removal of organic pollutants from aqueous solutions, such as adsorption, chemical precipitation, ion exchange, membrane processes, biological degradation, chemical oxidation and solvent extraction. Adsorption is the most popular method in which activated carbon or ion exchange resins are usually applied. Activated carbons have the advantage of high adsorption capacity for organic compounds. However, because of its relatively high cost, there have been attempts to utilize low cost, naturally occurring adsorbents, to remove contaminants from wastewater. Recently, the usage of natural mineral sorbents for wastewater treatment is increasing because of their abundance and low price. In this work organobentonites (Mt16-1CEC, Mt16-2CEC) were synthesized using hexadecyltrimethyl ammonium bromide (HDTMAB) by the cation exchange method. To identify these clays we have characterized them by X-ray diffraction structural analysis by BET and FTIR analysis. The adsorption was carried out according to the following parameters: pH, initial concentration, contact time, temperature and mass. Several kinetic and equilibrium models were used to determine the parameters of the adsorption of benzoic acid and salicylic acid by the two organobentonites. Also, the thermodynamic parameters and the nature of the mechanism governing the adsorption of the two acidic pollutants were estimated.

PP-049

**Thermodynamic Modeling of Internal Combustion Engines (Theoretical Cycle)**

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The objective of achieving the optimum operating conditions of alternative internal combustion heat engines in all areas of operation, while respecting the severity of pollution standards seems contradictory. This apparent antagonism is special attention in the field of research, evident in the improvements and enhancements that continue to mark the automotive industry. We are interested in our work in the numerical modeling of thermodynamic cycles in the study of the operation of internal combustion engines mathematical equations based on certain physical phenomena that act inherent in the process of energy conversion in internal combustion engines is determining the average pressure and the thermal efficiency giving importance to judge the quality of thermodynamically engine.

PP-050

**Evaluation of the Pollution's Impact on the Annual Sexual Cycle of *Chelon labrosus* (Teleostei, Mugilidae) from the Coast of Annaba (North East of Algeria) by Glutathione-S-Transferase and Acetylcholinesterase Dosage**

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Pollution of the marine environment generates a major environmental stress especially for fish. By the determination of Glutathione S-transferase (GST) according to the method of Habig *et al.* (1974) and Acetylcholinesterase (AChE) according to method of Ellman *et al.* (1961) during an annual reproductive cycle, the impact of pollution is determined on the *Chelon labrosus* sampled at two Annaba's coastal sites (Northeast Algerian), Cape de Garde distant from pollution sources, and Sidi Salem contaminated by various untreated waste, urban industrial and agricultural. The dosage of the GST in the liver of *C. labrosus* shows highly significant differences ( $p \leq 0.01$ ) for samples of Sidi Salem from those of Cap de Garde during gonadal maturation phase, at the end of the laying and sexual rest. However, the results reveal significant differences ( $p \leq 0.05$ ) at the start of laying and during the phase of pre-maturation whereas in post-spawning phase samples of both sites showed no significant difference ( $p \leq 0.5$ ). The dosage of AChE in the brain of *C. labrosus* revealed highly significant differences ( $p \leq 0.01$ ) in Sidi Salem in relation to Cap de

Garde during the maturation phase, at the end of the laying and sexual rest. Significant differences ( $p \leq 0.05$ ) are similarly observed in early spawning, post-spawning phase and during the pre-maturation phase. The overall results indicate the vulnerability of *C. labrosus* subjected to oxidative stress in breeding with neurotoxicity caused by a marked level pollution at site Sidi Salem in relation to the site Cap de Garde characterized by a important hydrodynamic regime, contributes to the dilution of the pollutants.

PP-051

**Purifying Effect of *Elodea Canadensis* on Wastewater of the Wadi Meboudja (Annaba, Algeria)**

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The study of pollution in the wadi Meboudja is performed by quantitative and qualitative evaluation of certain pollutants characterizing its waste water. Uncontrolled and untreated discharges from multiple sources flow into the wadi by the existence of important domestic and industrial effluents especially with the development of industrial infrastructure in the region of Annaba. The purification effect of hydrophyte *Elodea canadensis* (Michaux, 1803) on this waste water is determined by the measurement of physicochemical parameters after 7 and 15 days of its introduction into these water environments. The results demonstrate the existence of multiple pollution, mainly by Nitrates, the Orthophosphates, Iron and Aluminium. This experiment also evince the positive purification effect of *E. canadensis* on the quality of waste water from the wadi Meboudja by lower levels of pollutants, mainly Nitrate downcast at 90%, and the rate of Iron and Aluminium, reduced respectively at 95% and 90%. This biological purification proves the good performance purification of *E. canadensis*, by its ability to eliminate pollutants in short-lived so purified water don't presents a threat to the natural environments and public health, and become eligible for irrigation.

PP-052

**New Modification Format of WI-FI IP Cameras**

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Developing of Electronics and radio technology make our modern lives easier. Here is the safety systems also share their own development. The security system used to protect the security of important facilities cameras. Before he was an advantage in the use of analog type cameras. Later, as a result of the development of the analog cameras and IP-IP network devices Wi-Fi made the transition to the camera. Analog cameras have the added ability to pass with less distance to be wired and curved. Analog cameras and IP cameras monitor cable in the event of any injury problems is lost experienced in the image. Differences from the Wi-Fi IP cameras provide the growing the transmission distance, What is based on the spread in a straight line to the transfer process signal of radio. The signal on this occasion (image) leads to gloss over the distance farther. Wi-Fi IP camera of the most important weaknesses of the existence of the antenna attachment protrusion is able to undergo this antenna can break easily and can deformation. So, leave the radio and acceptance may weakened by the monitor may be lost in the end. Therefore, if the same IP Wi-Fi as the distance the camera (2.4 GHz, 12.4sm / 4 = 3.1sm antenna) is more reasonable to be placed in the body of the camera. It takes energy one camera to another in the 12 V DC voltage, this wire is broken and stops eventually cut occurs activities. Such fiction is placed in the cell of its own to avoid the situation, if the cut occurs (if the wire breaks) can provide the necessary energy for the battery temporarily camera. In this article we will discuss the main point antenna provides more confidence and indicated for the camera to ensure with essential energy.

PP-053

**Wireless Sensor Networks**

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In this study, early warning system that aims detecting forest fires using Wireless Sensor Networks has been founded. Nowadays it can be possible to install quite large Wireless Sensor Networks as they have low energy consumption and cost. This situation has allowed tracking environmental issues which influence wide geographical regions. The structure of the applied system includes lots of randomly distributed wireless sensor nodes which contain temperature sensors. First of all in this system, the environment temperature has been measured periodically by wireless sensor nodes which contain temperature sensors. After the environment parameters have been measured by sensors, they have been converted to digital data in microprocessor, and afterwards these digital environment data together with location and time information which taken by GPS module build data packages. These data packages have been sent to the gateway which has a direct connection to the computer by using wireless communication protocol ZigBee. The data of environment temperature, location and time information, sent by the gateway, are visualized by software program. The information also has been stored on a database in the computer. Moreover, GSM/GPRS module in the sensor node sends a warning SMS to a particular GSM number if critical situation or alarming situation occurs. This situation provides an alternative notification channel in case there is a failure in ZigBee wireless communication. Furthermore, whole processes of the hardware platform of warning and observation from its design, implementation to final product are completely done throughout the research. LCD in this platform illustrates the environment temperature and accurate location information of the sensor node, so another alternative notification channel addition to software in the computer has been found.

PP-054

**Comparative Study of Calcium Alginate, Activated Carbon, and Their Composite Beads on Methylene Blue Adsorption**

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Three adsorbents, calcium alginate beads (AB), activated carbon (AC), and calcium alginate/activated carbon composite beads (ACB) were prepared for the adsorption of methylene blue (MB). The adsorbents were characterized by scanning electron microscopy, fourier transform infrared spectroscopy analysis, the point of zero charge and energy-dispersive X-ray spectroscopy. The effects of solution pH (3–12), temperature (30, 40, and 50 °C), initial concentration (25–500 mg/L), and contact time were investigated for the three adsorbents. Results showed that the maximum monolayer adsorption capacity of AB, AC and ACB beads for the adsorption of MB were 103.35, 228.31 and 271.73 mg/g at 30 °C, respectively. The results showed that the lowest percentage removal of MB was found at pH 3, and it gradually increased up to a certain pH for the three adsorbents.

PP-055

**A Theoretical Investigations of Thermal Performance of Wall with Different Structures**

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The growing trend in building energy consumption will continue during the coming years due to the expansion of built area and associated energy needs, as long as resource and environmental exhaustion or economic recession allows it. Private initiative together with government intervention through the promotion of energy efficiency, new technologies for energy production, limiting energy consumption and raising social awareness on the rational use of energy will be essential to make possible a sustainable energy future. The energy consumed by buildings is around 30-35 % percent of total amount energy consumption of Turkey and very large amount of this portion of energy is used to meet heating load of the buildings. Due to the lack of regulations in encouraging the solar energy utilization in buildings, the heating energy consumption plays an important role in the energy economy of our country. Therefore, energy conservation methods become necessary. Wall thermal insulation plays more and more important roles in building energy conservation. Today's low-energy buildings often improve on this ancient technique by incorporating a thermal storage and delivery system called a Trombe wall. A research project is conducted to investigate the thermal performance of the south wall with different structures (Normal wall and as a wall with Isolation then as a standard Trombe wall). Wall systems could be investigated by using simulation programs such as TRNSYS. This is an ongoing project and the preliminary result of the project are presented in this paper.

PP-056

**A Compact Green-Laser by Second Harmonic Generation**

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The authors have demonstrated a compact green laser based on Nd:YVO<sub>4</sub>/MgO:PPLN green module, which are in high demand in the laser display industry. As pumping light source, C-mount 808nm pump laser diode was used. A linearly polarized 532 nm laser light of 1 W was obtained with optical to optical conversion efficiency of 30%.

PP-057

**Development and Mechanical Characterization of Polymer Concrete Based on Waste Marble and Date Palm Fiber**

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This work is an experimental approach for the development and characterization of a polymer concrete. In this study, the polymer concrete consists of sand (quartz) and orthophthalique polyester used as a binder. We have added a marble powder to ensure the continuity of the particle size of the granular mixture. As reinforcement, natural date palm fibers are used. The results of tests on different smooth specimens of polymer concretes with different rates of charges (marble), solicited on three-point bending, showed that the polymer concrete with 20% of marble is stronger and more rigid compared to other grades. Hence, a rate of 20% of marble powder is selected as the optimal value in the development of polymer concrete reinforced plant fibers. Flexural tests on specimens of polymer concrete reinforced fiber showed that the improvement or the degradation of material properties seemed to be attributed to the nature (treated or untreated) and/or fibers sizing (short or very short) of fibers.

PP-058

**Market and Technology Analysis of Medical Imaging Devices in S. Korea**

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*Korea Institute of Science and Technology Information*

Medical imaging devices are apparatus for technique and process of creating visual representations of the interior of a body for clinical analysis. There are both radiation and non-radiation method. The former includes X-ray camera, computed tomography, C-arm or O-arm, breast cancer diagnosis equipment, positron emission tomography, and the latter includes MRI, OCT, ultrasound devices, endoscopy.

This industry shows that there are limited buyers(hospitals) and the most critical point is safety and reliability, so that devices are regulated by FDA, TVU, CE marking, etc. There is a tendency for users to use existing 'famous' products and there are a number of different regulation and rules in countries by countries. The industry is characterized by granular medium-sized market and small quantity batch production.

Imported products have been continuously increasing since the level of technology, capital strength, awareness/recognition of South Korea in the industry is somewhat low. There are many small and medium sized companies but not a global top one in South Korea. So, they mostly manufacture middle-low price products.

Main technology trend is complex/fusion such as ultrasound-guided hifu, MR hifu, Tomotherapy, operation robot, MR-LINAC, PET-CT, PET-MRI. Mutually and organically integrated solutions become an answer to complicated diagnosis process due to multi-modality. Development of nuclear medicine imaging devices is noticeable. For example, PET/CT is a gold standard in oncology. There are also tendencies to develop devices with low radiation and high resolution, so that the processes for diagnosis or treatment are minimized, as well as multi-modality imaging system development showing paradigm shift to personal medicine, molecular medicine.

PP-059

**Analysis for Computational Ways to Use Health Information Effectively**

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Despite an increase in life expectancy and the aging of population, health information and related law lacks standardization in many countries. Since the healthcare industry has a very sensitive nature of law, government's involvement is very critical. And medical technology and its related structure is highly dependent on government's subsidies. One of the important issues with the health information structure is security of information like patient's medical information, which is why it must be accompanied by a high reliability. And although data are complicated, various, and usually have a tremendous amount of data, instant data acquiring is compulsory. The cloud system is expected to be popular even though maintenance, upgrade or follow-up service cannot be done instantly. Security matters could be resolved by storing personal data server within companies and using client server for all others. Portable and voice-recognizing devices can help doctors store, see and use data, so that they can make an instant decision. The most important issue is standardization of medical terms and programs. It is needed to extend sales networking, minimizing intermediary traders or brokers. And some global companies have some issues that hospitals in some countries are in favor of local company products due to AS system. This kind of matter could be resolved by local intermediary traders that can follow up immediately for AS and educating users.

PP-060

**Nanoencapsulation of Essential Oils with Biocompatible Polymers as Carrier for Pharmaceutical Application: Overview**

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Essential oils derived from plants are widely used in pharmaceutical applications due to its biocidal and medicinal properties. Owing to its highly volatile and complex nature, it needs to be protected from degradation and uncontrolled release, ensuring the efficiency and stability of the bioactive and probiotic molecules that are present in these essential oils. Nanoencapsulation of essential oil is rapidly gaining attention as they improve protection and stability with a larger surface area, consequently increasing its loading capacity and solubility. This method is justified by factors such as the type, physicochemical, and rheological properties of both biopolymer and targeted essential oil, including particle charges, size and phase. This overview report discussed the methods employed for nanoencapsulation and focused on the characteristics of biocompatible polymeric carrier, or biopolymers that attribute to the properties of biodegradability, increased shelf-life and encapsulation efficiency, as well as non-toxicity tailored for pharmaceutical applications.

PP-061

**Nanosized CeO2, Al2O3 and ZrO2 Mixed Oxides Loaded with Ni: Influence of Supporting Oxide on Thermal Stability Properties of the Catalysts For Hydrogen Production**

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The catalytic partial oxidation of methane (POM) to CO and H<sub>2</sub> is of great practical importance in utilization of natural gas. In the past decades, extensive investigations have been made in POM since the reaction is mildly exothermic, highly efficient and can produce synthesis gas with a H<sub>2</sub>/CO mole ratio of 2, which is well suitable for the methanol synthesis and the Fischer-Tropsch reaction [1]. The practical application of partial oxidation of methane needs a suitable and active catalyst. Many studies have focused on Ni/Al<sub>2</sub>O<sub>3</sub>-based catalysts because it is more economical than precious metals even though it is more sensitive to coke formation and unstable at high temperature (>700 °C). Recently, there is much interest in a new generation of mixed oxides of CeO<sub>2</sub>, ZrO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub>. It was reported [2,3] that the introduction of ZrO<sub>2</sub> to ceria leads to improvements in ceria's oxygen storage capacity, redox property, thermal resistance and better catalytic activity. In this work supported Ni catalysts (Ni/Al<sub>2</sub>O<sub>3</sub>, Ni/ZrO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>) were prepared by impregnation and Ni-Ce<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> (x=0, 0.25, 0.5, 0.75, 1) catalysts were prepared by sequential impregnation method and tested in the catalytic partial oxidation of methane to investigate the effect of support material. Ni-Ce<sub>0.75</sub>Zr<sub>0.25</sub>O<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> reveals high activity as well as high stability in POM. This is mainly ascribed to the beneficial pre-coating effect of CeZrO<sub>2</sub> resulting in the existence of stable NiO<sub>x</sub> species, the strong interaction between Ni and the support and abundance of highly mobile oxygen species in itself.

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[2] Putna E S, Bunluesin T, Fan X L, Gorte R J, Vohs J M, Lakis R E, Egami T. Catal Today, 1999, 50: 343

[3] Takeguchi T, Furukawa S, Inoue M. J Catal, 2001, 202: 14



PP-062

**Reproductive Biomarkers of Farmers Exposed Chronically to Pesticide**

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The ever increasing use of pesticides in agriculture and public health has become a major cause of sterility in human and various animals, particularly in males. This study was undertaken to screen the impact of pesticides on reproduction among some farm workers in the North east of Algeria. Therefore the reproductive biomarkers of workers exposed to pesticides from pilot farm during spring season in the north east of Algeria were investigated. Subjects were working either in the free-air field, or in the closed greenhouses. A third unexposed group of workers was used as a control. The exposure periods to different types of pesticides were between 2 and 11 years. Blood samples were collected in the morning and the serum levels of luteinizing hormone (LH), follicle stimulating hormone (FSH), testosterone (T), estradiol (E2), free thyroxin (FT4), total triiodothyronine (TT3) and thyrotropin (TSH) were estimated by the enzymatic immunoassay method. The obtained results showed a significant decrease in the LH concentration of the greenhouse workers compared to the control. There was also a significant depletion in the FSH and testosterone levels of all workers exposed to pesticides. The concentration of T3 have not been affected during pesticides' exposure. However, an significant decrease in the concentration of T4. On the other hand, the level of TSH and estradiol were significantly risen only in the greenhouses workmen compared to the control. To conclude, the exposure to pesticides could disrupt some reproductive biomarkers, especially those working in closed area of greenhouses.

PP-063

**An Android Application for Detection of Kayser-Fleischer Ring in Patient with Wilson Disease**

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In this project, I target to solve a problem that a common symptom of Wilson disease. Wilson's disease or hepatolenticular degeneration is an autosomal recessive genetic disorder in which copper accumulates in tissues; this manifests as neurological or psychiatric symptoms and liver disease. Wilson disease has many symptoms but Kayser-Fleischer ring is the easiest symptom that can be detected by computer based image detection systems. Kayser-Fleischer rings (KF rings), a pathognomonic sign, may be visible in the cornea of the eyes, either directly or on slit lamp examination as deposits of copper in a ring around the cornea. These ring's detection is going to target to help doctors and patients to detect that symptom and it is going to decrease labor that needed for this process. Unfortunately, doctors cannot help to patients as soon as possible that patients needed. Also when we looked from other side, doctors are working hard and they can miss some symptoms of diseases. As an engineering student, I can solve this problem. I target to solve a problem that a simple symptom of Wilson disease. I am using JSEG algorithm to separate image and using a Microsoft Azure cloud system to process image with help of Android mobile phone. On the cloud, image processed and comparing KF ring with an ideal ring. After that, it comparing image and sending back a percent that calculates ideality of that KF ring. On calculations, JSEG algorithm working efficiently on ideal cases. It can detect 43 of 50 images that has that ring, with outline mean %52. Unfortunately, eye's image should be centered, if it's not, results are not good enough. In conclusion, this app working efficiently and it will be ready for daily using after a few upgrade.

PP-064

**Effectivity Analysis of Decontamination Products for Radioactive Materials Used in Nuclear Medicine**

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In this study, decontamination products were analysed in terms of effectivity and conclusive information about how a decontamination process should be performed in the case of contamination of radioactive 99mTc, 18F-DG, 131I and 201Tl, which are the most common radioactive elements used in Nuclear Medicine, have been presented. It was observed that existing radioactive washers are less effective than expected, alcohol has no effect on the decontamination of 99mTc, and the temperature and pH are the most important factors. In the light of the analysis, it is concluded that the most effective decontamination product is DM-D (Decontamination Material-D) for 99mTc, 18F-DG, 131I and 201Tl. Analysis of the effect of DM-D for 99mTc contamination on various surfaces showed that decontamination is very fast on scrubs and formica although DM-D is very effective on skin while it is not effective on plastic floor covering material. Also in this study, the effectiveness of different molecular groups present in the decontaminant was investigated. As a result, the acetate group has been observed as the most effective component of the decontaminant.

PP-065

**Concentrations of Circulating Metallothionein 1, Copper, Zinc, Vascular Endothelial Growth Factor-A and Platelet-Derived Growth Factor-BB in Mitral Chordae Tendineae Rupture**

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Metallothioneins (MTs) are small cysteine-rich proteins which are involved in metal homeostasis, metal detoxification and protection against oxidative stress. Also, various MTs have been shown to regulate expression of proangiogenic growth factors, such as vascular endothelial growth factor-A (VEGF-A) and platelet-derived growth factor-BB (PDGF-BB). Besides, exposure to copper (Cu) and zinc (Zn) induced the expression of most MT1 isoforms. Chordae tendineae rupture process is associated with increased production of angiogenesis mediators in connective tissues, which contributes to oxidative damage and pathogenesis of degenerative chordae. Therefore, the aim of this study was to determine whether zinc (Zn), copper (Cu), VEGF-A, PDGF-BB and metallothionein-1 (MT1) levels are associated with angiogenesis processes in the context of a potential etiology causing aggravation of mitral chordae tendineae rupture. Forty-two subjects who were identical in demographic characteristics were selected for the study; 20 with mitral chordae tendineae rupture (MCTR) patients, and 22 healthy volunteers. The concentrations of plasma MT1, VEGF-A, PDGF-BB were determined by enzyme-linked immunosorbent assay. Also, Cu and Zn concentrations were determined by Spectroblue ICP-OES. The levels of Zn were found to be lower in the patients group when compared to control group (p=0.001). However, levels of Cu and MT1 were found to be increased in the patients when compared to control subjects (p=0.001 and p=0.002, respectively). There were no significant difference in plasma VEGF-A and PDGF-BB levels between two groups. There were positive significant correlations between VEGF-A and MT1 levels in patients with MCTR (r=0.516; p=0.02). Our data suggest that the levels of Zn decrease, while the levels of Cu and MT1 increase in patients with MCTR. We conclude that angiogenesis, oxidative stress, zinc and copper levels may contribute to the understanding of the etiopathogenesis of mitral chordae tendineae ruptured.

PP-066

**Relations Between Selenium Blood Levels and Proinflammatory Cytokine Production in Patients with Mitral Chordae Tendineae Rupture**

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Chordae tendineae rupture process is associated with increased production of inflammatory cytokines in connective tissues, which contributes to chronic inflammation and pathogenesis of degenerative chordate. Selenium (Se) is an essential micronutrient that suppresses the redox-sensitive transcription factor NF-kappaB-dependent pro-inflammatory gene expression. The aim of this study was to investigate the relation between serum selenium levels, and proinflammatory cytokine concentrations in mitral chordae tendineae rupture. Forty-two subjects who were identical in demographic characteristics were selected for the study; 20 with mitral chordae tendineae rupture (MCTR) patients, and 22 healthy volunteers. Selenium concentrations were determined by Spectroblue ICP-OES. Also, the concentrations of plasma interleukin-1 beta (IL-1β), interleukin-6 (IL-6) and interleukin-8 (IL-8) were determined by enzyme-linked immunosorbent assay. The levels of Se were found to be lower in the patients group when compared to control group (p=0.001). There were no significant difference in plasma IL-1β, IL-6 and IL-8 levels between two groups. There were positive significant correlations between IL-1β and IL-8 levels in patients with MCTR (r=0.457; p=0.043). Our findings suggest that the concentrations of Se decrease in patients with MCTR. We conclude that inflammatory response and selenium concentrations may contribute to the understanding of the etiopathogenesis of mitral chordae tendineae ruptured.

PP-067

**Innovative Teaching Strategies: Examples from Practice-Hybrid Simulation**

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**Background:** Nursing is a profession that theoretical and practical training need to be integrated. Different education strategies have been used to improve students' psychomotor and communication skills such as simulation, standardized patients, and part-task trainers. Students can examine all other parts of each other's bodies during the learning process; the sensitive parts of the anatomy remain areas that are not routinely appropriate. Performing a clinical procedure required integration of the acquisition of a technical skill with effective communication skills  
**Purpose:** Hybrid simulation allows students to practice complex skills and therapeutic communication simultaneously. Emergencies that require manual and verbal skills can be trained with 'hybrid' simulation. Increase realism and allow communication between team members and the patient.  
**Method:** We used to hybrid simulation in this study. Standardized patients provide feedback from the patient's viewpoint, highlighting a perspective that is often overlooked in clinical skills teaching and assessment. Hybrid simulation has also taken the form of pairing simulators with other simulators.  
**Results:** This study indicated that nursing students' satisfaction and confidence/competency were high after participating in hybrid simulation sessions. According to the study results, it is recommended to use hybrid simulation in nursing education as an innovative teaching strategy to develop students' clinical competencies and confidence.  
**Conclusion:** The outcomes following hybrid simulation experiences are of an incredible benefit to nursing students and faculty. It allows students to practice skills and communication techniques simultaneously and gives them the multitasking experience that they would get on the clinical floor. It can increase the diversity and complexity of simulation activities that can be offered

to students to cover complex scenarios and ensure patient safety, respect, and dignity during real-life encounters.

PP-068

**Development of Protein Based Therapeutic, with Anti-Cancer Activity**

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Lately there has been an increased interest in the role of reactive oxygen species (ROS) in experimental and clinical medicine. ROS are generated (i) as a natural byproduct of the normal metabolism of oxygen in the body; exposure to UV; by neutrophils and macrophages during inflammation, environmental pollutants etc. Excess production of ROS causes deleterious effects to cell structures, DNA, RNA and proteins which is cumulatively known as oxidative stress and contributes to the physiology of ageing. Increase in oxidative stress has been implicated in cardiovascular, neurodegenerative, diabetes mellitus, rheumatoid arthritis, atherosclerosis, autoimmune diseases and CANCERS. Health supplements with antioxidant activity are in high demand and are being used indiscriminately to stay healthy. However, there is not much proof that these oral supplements actually benefit the body or increase the antioxidant levels in the blood. This is mainly due to the degradation of most antioxidants in the gastric acidity (pH 4.0) and poor absorption in the intestine. We are currently developing a protein-based therapeutic that shows superior antioxidant activity and is resistant to the extreme environments of the human gut (proteolytic enzymes and low pH). MTT and 3H-thymidine incorporation assays revealed non-toxic nature of the protein towards human and mouse primary cells. The protein showed high inhibitory action towards cancer cells in vitro. Microarray analysis data from protein-treated cancer cells revealed significant change in gene expression profile of cancer-related genes compared to cell control. However, these gene pathways were not significantly affected in normal cells. In vivo experiments are currently underway.

PP-069

**Emerging Trends in Pharmaceutical Industry: Biosimilars Position of Turkey**

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Biosimilars are currently a hot topic for especially biopharmaceutical companies with differing regulations, ever changing approval procedures and looming patent expiries ensuring they are set to be a continuing subject of debate and discussion. EU first identified and defined a regulatory strategy for biosimilars in 2004. Since that time, multiple biosimilars have become available in the EU, including cancer supportive care agents, such as erythropoietin analogues and granulocyte colony-stimulating factors. According to the EMA guidelines, Biological medicinal product; the similarity is proven by product comparability studies against reference product licensed by EMA [1]. But the situation in US is quite different from EU. In the US; The biologics Price Competition and Innovation Act of 2009, enacted under the 2010 Patient Protection and Affordable Care Act, was the first step in the development of a biosimilar regulatory process[2]. This act delineated an accelerated approval approach for biologic products deemed to be interchangeable with their predecessor biologic agent. But till today, there is also some improvements. In Turkey, medicinal products, including biologics and biosimilars, can only be marketed once a marketing authorization has been issued by the General Directorate of Pharmaceuticals and Pharmacy of the Ministry of Health and according to the agency guideline, "biosimilar drug or biosimilar product" defined as a medicinal product which demonstrates similarity to a designated or retained biological (medicinal) reference product in terms of quality, safety and efficacy. The active substance of a biosimilar drug or product is similar to a biological reference drug. Generally, a biosimilar drug and a biological reference product are used at the same strength to treat the same disease. Typically, the only difference between a biosimilar drug and a biological reference product is the trade name, appearance and packaging [3]. Current status will be discussed.

[1] <http://www.ema.europa.eu>

[2] <http://www.fda.gov/>

[3] <http://www.titck.gov.tr>

PP-070

**Post-Traumatic Stress Disorder Symptoms of University Personal Later Earthquake in the East of Anatolia**

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**Objective:** Earthquakes are one of the most frequently occurring natural disasters and extensive research has been conducted on mental disorders on exposed populations, particularly on post-traumatic stress disorder (PTSD). The aim of this study is investigate post traumatic stress disorder symptoms and related factors in university personal.

**Method:** In this study 143 personal were selected from university located within Bitlis province in east of Anatolia, after one month a severe earthquake. They were chosen to participate in this cross-sectional study by simple random sampling. The personal were evaluated by the PTSD Checklist Civil Version Scale (PTSB-CL).

**Results:** 25.2% of university students had a value above according to the cut-off scores on the Post Traumatic Stress Disorder scale and the possibility of PTSD was considered in these personal.

The PTSD detection rate is expressively high in female personal.

**Conclusion:** The symptoms of PTSD may continue for years after natural disasters. Hence, prevention studies and the screening of university personal after disasters are important for the mental health of the community.

PP-071

**Analysis of Hepatitis C Virus NS5A Region in Cirrhotic Patients Using an Ultra Deep Pyrosequencing Method**

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HCV is genetically more diverse than HBV and HIV, and exists as quasispecies within infected individuals. This is due to the lack of efficient proofreading of the viral RNA-dependent RNA polymerase. Consequently, quasispecies emerge depending on mutation rate of the viral polymerase, which may display a high level of genetic variability in a population. In infected individuals, HCV replicates and circulates as a quasispecies composed of a complex mixture of different but closely related genome that undergoes continuous change due to competitive selection and cooperation between arising mutants. The aim of this study was to investigate the genetic variability of the NS5A region in cirrhosis patients using an ultra deep pyrosequencing method (UDPS). Five patients with HCV related cirrhosis were analyzed. Three of them received interferon plus ribavirin for six months, but two patients did not received therapy. HCV-RNA concentrations from serum samples of all patients were determined using a COBAS AMPLICOR HCV MONITOR Test, Version 2.0. Genotyping was performed by using a commercial reverse hybridization method, Line Probe Assay. The quasispecies for NS5A region were investigated using UDPS. All patients were HCV genotype 1b. A total of 18 different mutations were detected in 5 patients. The frequency of mutations varied from 8.7 % to 100% of the total HCV population.

UDPS is a new sequencing technology and a very sensitive method in detection of quasispecies with low frequency NS5A region mutations were frequent in naïve and non-responder patients. These mutations may affect the antiviral response and development of HCC. However, further studies with larger number of patients should be conducted to clarify this hypothesis.

PP-072

**Immunopathological Role of FAS-FASL Apoptotic Pathway in H.pylori CagA Positive Associated Chronic Atrophic Gastritis in Iraqi Patients**

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**Introduction:** Chronic atrophic gastritis (CAG) characterized by chronic inflammation of gastric mucosa with loss of gastric glandular cells and replacement by intestinal-type epithelium and fibrous tissue. CAG may be associated with Helicobacter pylori infection.

**Objective:** To determine the role of FAS-FASL Apoptotic pathway in H.pylori CagA positive associated chronic atrophic Gastritis

**Methodology:** According to exclusion criteria (45 ) CAG patients and (20 ) control were chosen. Multiple gastric mucosal biopsies were taken for rapid urease test and slides preparation from paraffin blocks. Biotinylated DNA probe for human FAS, FASL, genes were used for detection of their expression in tissue lymphocytes and gastric epithelial cells using ISH technique. Biotinylated DNA probe for H.pylori Cag A gene was used for detection of its expression in gastric epithelial cells. Tunnel assay was used for detection of apoptotic index.

**Results:** Insitu CagA was detected in (46.66%) of CAG cases. The toxin was not detected among control. Tissue FAS mRNA expression was higher than lymphocytes FAS mRNA among CagA positive and CagA negative CAG cases. Tissue infiltrating lymphocytes (TILs) FAS expression was higher among Cag A positive than Cag A negative CAG cases. Significant difference in FASL mRNA between Gastroduodenal tissue (GDT) and TILs among Cag A positive and Cag A negative CAG cases was detected. Significant difference in GDT versus TILs - Apoptotic Index (AI %) among CagA positive and CagA negative CAG cases detected. GDT FAS has positive correlation with TILs FAS, TILs FASL and TILs AI%. Positive correlation was detected between TILs FasL and TILs AI%.

**Conclusions:** FAS-FASL pathway play vital role in Immunopathology of H.pylori Cag A+ associated gastritis that leads finally to atrophic changes.

PP-073

**Market and Technology Analysis of Collagen Industry**

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Collagen accounts for about 30% of the protein in the human body and is present mainly in the bones and skin of animals. The functionality of collagen is known for immunity, skin aging prevention or healing of damaged skin by burn or wound, growth promotion, prevention of osteoporosis, or blood pressure suppression. It is also used as an additive to improve texture of food. As the population is aging and appetite for improving the quality of life is rising, especially in industrialized or newly industrialized countries, collagen-related products are being popularly sold in various sectors such cosmetics, medical care and health related products. Collage industry can be a big market since beauty and health is a big concern to all ages. With the increasing income and consumer awareness of beauty and health in newly developed countries as well as developed countries, future market prospects of collagen are bright. Study on new functionality and new sources of collagen other than livestock appendage, fish, marine extracts is growing. And various researches by using or making low molecular weight materials or water solubility have been studied to improve absorption in body. Collagen world markets are forecast to reach 850 million US dollars in 2018 from 580 million US dollars in 2012 with 6.6% CAGR. The leading global consumption market is Asia(38.6%) and the next is North America(28.1%) while the main production areas are Europe and Asia-Pacific. The three major companies, Gelita AG, Rousselot, and P.B. Gelatines account for about 60% of the worldwide market revenue. Based on consumer awareness about the collagen function, consumer preferred target products according to various age groups are important for effective marketing. Although competitive materials such as hyaluronic acid and chondroitin sulfate exist, their side effects can be a positive factor in collagen demand.

PP-074

**Analysis of Omega-3 Industry Growth Potential**

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Omega-3 is polyunsaturated fatty acids with a double bond at the third carbon atom from the end of the carbon chain. There are three types of omega-3 fatty acids:  $\alpha$ -linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). Marine algae and phytoplankton are primary sources of omega-3 fatty acids. The functionality of omega-3 is known for prevention of cardiovascular effect such as hypertension, atherosclerosis, hyperlipemia by cholesterol and blood lipids as well as eye protection or brain development.

The main application of omega-3 is food additives, pharmaceutical products, animal feed additives, or nutritional supplements.

The technological core issues are to remove smell and taste of fish oil and concentration technique for medical purposes.

Omega-3 world markets are forecast to reach 4.3 billion US dollars in 2018 from 2.4 billion US dollars in 2014 with 12.3% CAGR.

The top four major companies, Pronova BioPharma(BASF), DSM, Nippon Suisan account for about 60% of the worldwide market revenue, followed by GC Reiber, EPAX, Hubei Fuxing, and Lonza. The growth rate of fish oil base omega-3 is expected to be higher than vegetable omega-3 even though market of omega-3 from vegetables still continues to grow. It is due to lack of public awareness of algae oil and low production capacity compared to fish oil.

The main market drivers are increasing public awareness of omega-3 effects, recommended intake of omega-3 in some countries such as South Korea, increasing needs of high quality omega-3 products with a highly concentrated raw materials.

The main market restraints are lack of product differentiation, product price volatility possibility of relying on imported raw materials, possible demand decreasing due to multi-functional alternatives.

It is expected that the market expansion of omega-3 as food additives and pharmaceutical products is forecast since health food demand will continue due to rising awareness of omega-3.

PP-075

**Core Technology and Industry Trend of Probiotics**

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Probiotics are microorganism(live bacteria and yeasts) that are good for your health, especially your digestive system. Bacteria should show a beneficial effect on the body by surviving in stomach acid and bile acid, reaching, growing and settling in intestines. In addition, it must be non-toxic and apathogenic. Three main effects of probiotics are metabolism activation, intestinal regulation, and immune modulation. Metabolism activation leads to lessening colorectal cancer occurrence, decreasing cholesterol and lactose intolerance. Intestinal regulation improvement means that autoimmune system strengthens and food allergy or inflammatory bowel disease get moderate. Irritable bowel syndrome and pathogenic microorganism are suppressed by increasing lactose tolerance. Recently, range of probiotics industry is expanded to prebiotics helping improving effect of viable cells, or dead bacteria-related products to show health improvement. More and more, not only health supplement products, but also cosmetic industry, medicine industry, and livestock industry are getting involved with probiotics. Due to these effective impacts, probiotics industry is expected to show high growth even though general health functional food market seems stagnant. The main technology competitiveness is reinforcement of reaching and surviving ability of viable cells to intestines by coating, prebiotics, and refrigeration technologies.

PP-076

**NET and 5-Forces Analysis of Health Functional Food Industry in South Korea**

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Health functional food is a food with a health-promoting or disease-preventing function. There are two kinds of functional food ingredients; "officially notified ingredients" and "individually approved ingredients" by Korean Ministry of Food and Drug Safety.

As population is aging, demand of dietary food increases, expectation of cosmetic effect from food is getting high, health functional food become to grow fast, while there is still a low reliability of effect/function, short product life cycle, and polarization of revenue between blockbuster products and non-blockbusters. prevalent online sales of functional food, huge interest in immunity due to environmental contamination like air pollution, and health oriented consumption propensity make functional food industry flourish. But, many companies should pay lots of royalty to foreign brands and the industry relies on foreign economic policies of government or quarantine system. Technologically, various R&Ds are expected for gentrification of food and organic food development. But it will be hard to differentiate products and prove safety and functionality of food. Power of suppliers will be high since raw material or ingredients consists of about 20% of a product and only notified or approved ingredients should be used. So far in Korea, call sales or multilevel sales are more popular for functional food than online sales, but online revenue is expected to grow very fast. Often, since there is an exclusive contract between ingredient company and selling agencies, it is very critical to find valuable marketing channels. It is expected that threat of substitution and threat of entry will be low since the barrier to register for a company for functional food production is low in terms of regulation, but in order for an ingredient to get approved by KMFDS, much investment is needed. Since Korean functional food market shows oligopolistic competition, the degree of internal rivalry will be intense.

PP-077

**Current Competitive State Analysis of Foreign and Domestic Markets in Animal Functional Food**

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Animal functional food world markets are forecast to reach 17.3 billion US dollars in 2019 from 11.7 billion US dollars in 2011 with 5.1% CAGR(compound annual growth rate). The leading global consumption market is US(45.6%) and the next is Europe(40.4%). For functional food for submerged cultivation or pets, North America and Europe is expected to grow faster than Asia-Pacific. But in Asia-Pacific region is expected to show continuous growth due to income level growth and increasing meat consumption. More than 70% of animal functional food consists of pig/chicken(73.4%), and the next is cow(19.2%). In pet-related market, feed additive has 31% market share in US and 38% market share in Japan. The top 3 major companies occupies about 30% market share: Novus International, Evonik Industries, and Adisseo/China National Bluestar Co. Ltd. Companies in Europe and US are mostly major ones, but there are newly emerging companies in Asia-Pacific. Archer Daniel Midland Company, BASF, Nutreco Holding N.V., Royal DSM N. V. are another major ones. Major pet-feed additive companies are Mars Petcare Inc., Nestle Purina Petcare, Hill's Pet Nutrition, P&G Pet Care, and Del Monte Foods Co. There are also very active mergers and acquisitions in animal functional food market. Some examples are that Cargill(major assorted feed company) took over Provimi(major feed additive company), that BASF took over Cognis, that DSM took over Martek, Tortuga, and that Biomin took over Phytogen, etc. In South Korea, Copebet-special, miraejawon ML, CheilBio, EasyBio, CTCBio, AmiBio, JinBiotech, Daeho are the major animal functional food companies. Major companies in South Korea has reached 70~80% technology level compared to world top technology by active R&D, and shown continuous revenue growth.

PP-078

**Paper-Based Analytical Devices for ABO and Rh Blood Group Typing**

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ABO and Rh blood group typing are one of the most significant testing in blood transfusion laboratory. There is a need to develop bedside blood typing without the need for instrument for remote area. The paper-based device was designed as dendritic arms. Each arm contains two parallel channels for test and control. The center of the device was used for loading of blood sample. For forward grouping purpose, Anti-A, Anti-B, Anti-A,B and Anti-D were impregnated in each hydrophilic channels. After sample loading at the center area of the device, blood cells were allowed to interact with immobilized antibodies fixed in each channel, resulting in agglutination and immobilization of the cells in the fiber matrix. In parallel channels, inactive antibodies of Anti-A, Anti-B, Anti-A,B and Anti-D were immobilized in each control channel which served as negative control. The solution containing 0.9% NaCl and 1% Tween-20 was suitable to elute non-agglutinated blood cells without interfering with agglutinated cells. The migrating distance of agglutinated red cells was compared with that of non-agglutinated red cells in their respective paper channels and used as criteria to determine the presence or absence of specific antibody or antigen. For reverse grouping, plasma was applied at the center of the device to allow the specific antibodies in the plasma to interact with standard A-cells, B-cells, or O-cells. Elution and interpretation of cell agglutination were similar to cell grouping. The assay time for Rh grouping and forward and reverse ABO grouping was only 5 minutes. The devices showed excellent reproducibility for both forward and reverse grouping and consistently yielded the same blood group in multiple testing (n = 40). In conclusion, our newly developed device is an alternative low cost and portable point-of-care blood typing device that could greatly benefit military medicine and in remote area in developing countries.

PP-079

**Simultaneous Determination of Rh Typing and Forward and Reverse ABO Blood Groups Using a Paper-Based Analytical Device**

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Incompatible ABO and Rh blood groups can cause fatal transfusion reactions and death. Thus, accurate blood group typing is essential for selecting compatible blood sample for recipients. Low-cost point-of-care-testing (POCT) blood typing devices are in high demand for remote areas in resource-limited developing countries. Herein, paper-based analytical devices (PADs) that can perform three functions, including Rh typing, and forward & reverse ABO blood typing, within one device were successfully developed. To fabricate the paper device, Whatman No.1 paper and blood separation membrane were attached by using a wax printing and wax dipping methods. For forward grouping, Anti-A, Anti-B, Anti-A,B, and Anti-D has been pre-immobilized at each hydrophilic channels. Diluted blood or whole blood sample was dropped onto the PAD for forward and reverse grouping, respectively. For reverse grouping at the opposite end of the forward typing, A-cell and B-cell were dropped into each hydrophilic channel allowing the separated plasma to react with the cells. The migrating distance of the red cells to the migrating distance of the plasma was used as criteria to determine the presence or absence of specific antibody or antigen. Our proposed PADs were tested with blood samples from 48 volunteers. The accuracy of this device was confirmed with slide and tube methods and was found to be in the range 85-100%. In addition, an in-house MATLAB program is able to read and interpret the blood type similar to our manual method, but with 6 time faster speed. In conclusion, our paper-based POCT are valuable and practical in remote areas of developing countries and could conveniently use in emergency clinics and bedside especially.

PP-080

**Immune Complexes Might Effect Holotranscobalamin Assay of Vitamin B12 Deficiency in Myeloproliferative Disorders**

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**Objective:** HoloTranscobalamin method is a first choice assay for detecting true vitamin B12 deficiency in meloproliferative disorders(MPD) made up of polycythemia vera(PV), essential thrombocytosis(ET), chronic myeloid leukemia(CML) and myelofibrosis(MF). In this group of diseases vitamin B12 levels are measured falsely elevated with conventional methods because of increased carrier protein synthesis in MPD. Our objectives were to determine effects of immunocomplexes on HoloTranscobalamin(activeB12) assay. **Method and Patients:** VitaminB12 levels in patients followed up at our hospital hematology clinic for myeloproliferative disorders were measured by both electrochemical immunoassay and HoloTranscobalamin methods. To exclude immune complexes, samples were treated with polyethylene glycol(PEG) and HoloTranscobalamin assays were repeated. Also methylmalonicacid (MMA), folate, homocystein, liver, and kidney function tests were obtained. The exclusion criteria were patients with chronic gastrointestinal disorders, prior gastric/ileal resection, concurrent metformin use, being on an absolute vegetarian diet. **Findings:** When we measured B12 levels by using HoloTranscobalamin, we found low levels of B12 in 14 patients(%18). Active B12 was %36 sensitive and %86 spesific. After PEG treatment, 25 of patients (%50) were vitamin B12 deficient and the sensitivity, specificity of HoloTranscobalamin methods for vitamin B12 deficiency were %76 for each. In this patients, vitamin B12 deficiency was %62 by measuring MMA. B12 levels by HoloTranscobalamin assay decreased by %19 in ET, %40 in KML, %30 in MF and %21 in PV patients. **Conclusion:** Our results showed that Immunoglobulin–HoloTranscobalamin complexes may affect holotranscobalamin assays which have been recently reported to have a superior diagnostic accuracy for vitamin B12 deficiency.

PP-081

**Design of an Orally Disintegrating Tablet Formulation Containing Metoprolol Tartrate with the Help of Artificial Intelligence Programs**

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**Purpose:** In this study, developing an oral disintegrating tablet (ODT) formulation containing Metoprolol tartrate (MT) with appropriate quality features, will be produced by direct compression method with the help of artificial intelligence programs was aimed. **Material - Methods:** While constituting the design of experiment (DOE), determination of the Critical Quality Attributes (CQAs), formulation variables (CMAs) and Critical Process Parameters (CPPs) were studied risk-based in accordance with ICH Q8 and Q9. Experimental knowledge area has been created with physical and chemical tests results obtained from the prepared tablets according to the formulation variables and process parameters designated with pre-studies. Data sets forming the knowledge area were evaluated with FormRules (neuro-fuzzy logic) program to understand the relationship between independent input variables and the CQAs; later with InForm GEP (Gene Expression Programming) program to gain an optimized formula. **Results:** The optimized formula were as a 163 mg tablet contains 25 mg MT, 60 mg Parateck® ODT, 76.46 mg Avicel, 1.95 mg Sodium stearyl fumarate and the compression pressure 408 psi. The formulation tested in the laboratory; has 4.3 Kpa hardness, 0.78 % friability and dispersed in 16 sec and shows compliance with the pharmacopoeia limits. To develop an ODT formulation that indicates appropriate quality characteristics and to guarantee the quality of products, the adoption of mathematical modelling via artificial intelligence programs has increased the efficiency of the development process with better understanding of the multivariate relations between the elements that affect the quality of the product.

PP-082

**Optimization of Nano-Sized Topical Colloidal Drug Carriers for Treatment of Atopic Dermatitis**

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Atopic dermatitis (AD) is a chronic inflammatory skin disease, which occurs occasionally in infants and children. Function mutations in the filaggrin gene and the activation and skin-selective homing of peripheral-blood T cells are reported in AD. Topical calcineurin inhibitors including tacrolimus inhibit the activation of T cells and mast cells by blocking calcineurin and suppressing inflammatory cytokines. Antimicrobial compounds such as fusidic acid are used in patients who are susceptible to secondary cutaneous infections [1]. In topical therapy, the treatment and prevention of acute inflammatory processes is essential to avoid exacerbation of the disease. However, it is important to overcome skin barrier to achieve sufficient drug concentrations in the target skin layers. Tacrolimus and fucidic acid are highly lipophilic compounds. Thus, it is required the optimization of novel topical carriers that may improve drug penetration and provide a sufficient bioavailability in the skin. Microemulsions are one of the nanosized carriers which are widely investigated to improve skin penetration of drugs [2,3]. The aim of this work was to develop microemulsions which carry both tacrolimus and fusidic acid. The optimum rates of microemulsion components were determined by constructing of pseudoternary phase diagrams. In order to characterize microemulsions particle size and its distribution, pH, conductivity and refractive index measurements were done. Physical stability of the formulations was assessed. In vitro skin penetration studies as well as biophysical measurements are going on to assess the efficacy of the developed microemulsions. Acknowledgement: This study has been supported by Republic of Turkey, Ministry of Science, Industry and Technology (01532. STZ. 2012-2) References

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PP-083

**Growth Inhibition of Pathogenic Bacteria Assessed in Vitro and in Food System Using Plant Essential Oils**

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The use of plant essential oils (EOs) as natural antimicrobials for food preservation (biopreservatives) is of great interest due to consumer demand of natural food products and a growing concern of microbial resistance towards conventional preservatives. Thyme and mentha are plants well known for their good proprieties and are in abundance in North Algeria. This study aimed to assess the antibacterial activity of EOs from *Thymus vulgaris*, *Thymus satureioides*, *Mentha piperita*, and *Mentha spicata* in laboratory media and in beef minced meat as food system. The inhibitory effect of EOs on *Staphylococcus aureus*, *Bacillus cereus*, and *Escherichia coli* was evaluated by agar diffusion method and dilution assay. The efficiency of EOs was then assessed in food system by calculating CFU in stored (refrigerated) minced beef meat inoculated with pathogens. Overall results showed the inhibitory effect of thyme and mentha EOs on all bacteria tested in Muller Hinton media. Indeed, *S. aureus* and *B. cereus* exhibited high growth inhibition when treated by *Thymus vulgaris*. The addition of EOs to inoculated minced beef resulted in decrease of *S. aureus*, *B. cereus* and *E. coli* population after 4 days of storage at 4±2 °C compared to the control (meat without EO). Moreover, no significant alteration of flavor and taste was revealed in treated meat by sensory test. These findings suggested the possibility of using of thyme and mentha EOs as natural preservatives in meat and meat products preservation

PP-084

**Ecotoxicological Assesment of the Impact Of Effluent from the Sewage Treatment of the Skikda Petrochemical Complex (North-Eastern/Algeria)**

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Our study carried on the assessment of the impact of effluent from the sewages treatment of the Skikda petrochemical complex on the marine environment with the help of bio tests on mollusk bivalves, the mussel *Mytillus galloprovincialis*. Notably by the dosage of the copper, zinc, manganese, iron and the cadmium for the sewages of the step, as well as the dosage of the same metals heavy bio accumulated by the molds. The results of analysis gotten, allowed us to put in evidence of the focusing raised of these elements, passing the values limits fixed by the regulation in force (Algerian) from afar.

PP-085

**Development and Future of Therapeutic Proteins**

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Proteins have an important role as a macromolecule in the body, such as forming receptors and channels in membranes, and transporting molecules within a cell or from one organ to another [1] and are developed as a class of pharmaceuticals [2]. According to disease mechanisms, causes of diseases can be abnormalities or mutation in protein, or high or low concentration of proteins. Protein based therapies can be used as an individualized treatment approach [2]. Expression of recombinant protein for therapeutic applications are derived from mammalian cells, bacteria, yeast, insects and plants [3]. Protein therapeutics have several advantages over small-molecule drugs such as specificity, naturality, well-tolerance by the immune system, no need for gene therapy, fast approval time for clinical development and from the FDA [2]. Insulin was the first human protein therapeutic derived from recombinant DNA technology and approved by FDA in 1982. Antibody-based drugs are emerging as the largest, fastest and most FDA-approvable class of therapeutic protein in the market with more than 50 % market share [3]. The global market for therapeutic protein is expected to be worth \$168 billion by 2017. In Turkey, no therapeutic proteins are recombinantly produced; however 25 original therapeutic proteins are imported and licensed to be sold. One of TUBITAK's strategic goal is to produce the first locally produced original therapeutic protein in Turkey by 2023. In this review, development and future of therapeutic protein will be discussed.

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PP-086

**Dissemination of Bacterial Antibioresistance in the Rivers of the North East of Algeria (Case study: Saf Saf River, the Region of El Harrouch)**

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The aim of our work was to evaluate the dissemination of bacterial antibioresistance in Saf Saf River the region of El Harrouch, the North East of Algeria. Water samples were collected monthly over a two year-period (February 2012-February 2014) from 4 sites: the embouchure of Saf Saf River with municipal wastes (sewages), the embouchure of the river with Oued N'ssa, the center of Saf Saf River and the embouchure of the River with hospital wastes. Bacteriological quality of Saf Saf River waters was determined using most probable number technique (MPN) of coliforms. Hektoen agar and the medium King A or King B were used for the isolation of enterobacteriaceae, and *Pseudomonas* spp. respectively. The antibiotics sensitivity of the isolated strains was tested on: Amoxicillin, Peperacillin, Ticarcillin, Cefoxitine, Cefazolin, Cefotaxim, Gentamicin, Imipenem, Furan and Colistin. The four sites were characterised by high levels of faecal contamination (> 1000 faecal coliforms /ml and > 1000 faecal streptococci/ml). *Enterobacter cloacae*, *Pseudomonas fluorescens* and *Klebsiella pneumoniae* were characterised by high levels of antibioresistance (54.54%, 50% and 47.72% respectively). The lowest value of antibiotics resistance was recorded with *C. freundii* (27.27%). All the isolates were sensitive to Imipenem and 0.96% were resistant to Cefazolin. Significant differences were recorded between the four sites ( $p < 0.05$ ). On the other hand high correlation was observed between the levels of coliforms contamination and antibioresistance in the sites under study ( $R = 0.91$ ). The prevalence of *E. coli* resistance is an estimation of the prevalence of the antibioresistant faecal bacteria. The highest level of *E. coli* antibioresistance was recorded in the embouchure with hospital wastes (47.73%). These results show the bad situation of surface waters in Saf Saf River which may influence the public health of El Harrouch and increase the risk of antibiotics multi resistance.

PP-087

**Effectiveness of Vitreoscilla Hemoglobin for Enhancement of Ethanol Production from a Mixture of Waste Products**

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In this work, the enhancement of bioethanol production from a mixture of waste materials from processing of potatoes and corn containing media through the use of the hemoglobin from the bacterium *Vitreoscilla* (VHb) was investigated. There were consistent increases in ethanol production coincident with VHb expression were observed. The increase in ethanol were entirely from an increase in ethanol produced per unit of biomass. In the work presented here shows VHb-associated increases in ethanol production were observed when sugars came from a mixture of normally wasted materials such as from potato and corn processing. The strategy of expressing VHb in heterologous hosts may be generally useful in production of ethanol via fermentation of sugars from a wide variety of sources that may otherwise be discarded.

PP-088

**Evaluation of the Wound Healing Potential of *Tinospora Crispa* in Rats**

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This research was conducted to assess the effect of the *Tinospora crispa* (*T. crispa*) extract on closure rate of wound healing potential, histology of wound area and inflammatory mediators; transforming growth factor- $\beta$  (TGF $\beta$ 1) and tumor necrosis factor  $\alpha$  (TNF- $\alpha$ ). Twenty adult Sprague-Dawley rats were used in wound healing evaluation experiment and divided into 4 groups. Experimentally, Two-centimeter-diameter full-thickness skin excision wounds were created on the posterior neck area using round seal. The animal groups were topically treated with 0.2 mL gum acacia as vehicle control group, Intracite

gel as reference group, and 100 and 200 mg/mL of *T. crispa* stem extract, respectively as experimental groups. Granulation tissue was excised on the 15th day and processed for histological and biochemical analysis. Wound healing was evaluated by measuring wound contractions and protein contents in the healing wounds. Cellular redistribution and collagen deposition were assessed morphologically using Masson's Trichrome stain. The sera levels of TGF- $\beta$ 1 and TNF- $\alpha$  were evaluated for all the animals. Rats dressed with *T. crispa* extract showed significantly accelerated wound healing closure, increased TGF- $\beta$ 1 level, decreased TNF- $\alpha$  levels compared with the rats dressed with vehicle or Intracite gel. Histology of wound healed area confirmed the results showing remarkable increase in collagen fiber, reduced leucocytes infiltration, while Masson's Trichrome stained sections showed remarkable increased collagen fibers in *T. crispa*-dressed wounds. In conclusion, the present study suggests that ethanol extract of the *T. crispa* stem possesses a significant excision wound-healing capability.

PP-089

**PEST and NET Analysis of Biopharmaceutical Industry**

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Biopharmaceutical industry is also called as biologic medical industry. It is distinct from chemically synthesized pharmaceutical products from petrochemical materials. Some representative products are biosimilars, cell therapeutic medicine, natural material-based medicine, vaccines, allergens, gene therapies, tissues, blood components, or recombinant therapeutic protein. Various industrial analysis regarding biopharmaceutical industry and its characteristics have been done as follows: Natural substances as a raw material for every part of industry as well as biologicals have been noted due to low cost and various effects. So a number of trials for scientification and standardization of natural substances have been done. Aging of population has been boosting the medicine industry, especially biologicals since biologicals represents customized products and small quantity batch production. Since OECD countries has been analyzing that bio-economy with biotechnology will be the general trend since 20th century, they have set up a number of regulations and incentives that support the development of biopharmaceutical products and related R&D, but there are still some problems to be solved out for standardization or overlapped investment. From a technological viewpoint, safety and reliability issues, low success rates of clinical trials, uncertainty of toxicity for bioactive metabolome still remain. Since there are several products of which patents have expired or will expire soon, biosimilar market is expected to grow significantly. Globalization of natural substance-based new medicine as well as securing original or source technology will be the main key for catching up with existing global biopharmaceutical companies.

PP-090

**Compared Morphometry on Populations of *Sardina Pilchardus* (Walbaum, 1792) Algerian Coastline**

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Our study is a morphometric investigation carried out comparison, on the sardine *Sardina pilchardus* (Walbaum, 1792), across the Algerian coastline. During 2013, samples of 471 fishes taken in 7 regions of the coastline from East to West. A series of 36 morphometric measurements were carried out on caught fishes. The Statistical processing of data, by univariate and multivariate methods allowed us to highlight significant differences, for fish of the same species, between different selected regions, and a sexual dimorphism in this subtropical species, erratic, gregarious, representing 40- 50% of the total national landings.

PP-091

**Contribution to the Microbiological Characterization of Forest Litter (Cork Oak in the National Park of El Kala**

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The national park of El Kala contains the most prestigious forest of Algeria. This forest grows on organic matter recycling substrate that is provided by the activity of living organisms from the ground. The cork oak is a tree stands at just over 13 meters but can nevertheless reach 25 meters, it is a heliophilous species which can survive long as 300 years. In order to know the structure of the microflora litter in cork oak forest at the station of the path of the birds we conducted a microbial analysis which is biomass of microflora (actinomycetes, bacteria, fungi) on a solid medium C Zapek Dox several dilutions. The result shows that there is a very strong concentration in the first layer ( $3 \times 10^7 \mu\text{g}$  of litter), the density decreases in the second layer ( $1 \times 10^4 \mu\text{g}$  litter). The decrease in total number is related to the decomposition of the litter, and especially with aeration. This differential evolution should be explored about its various aspects in the context of future work

PP-092

**Elevation of Glutathione-S-Transferase and Inhibition of Cholinesterase Activity as a Biomarkers of Fungicide Toxicity in Tadpoles (*Rana saharica*)**

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The issue of pesticides through their persistence in the environment and their potential impacts is now a major concern for the environment. All over the world amphibian populations disappear under the effect of these products. Water in particular is a major vector of all the contaminants. In this study, the toxicity of a systemic fungicide, the ARTEA 330EC newly used in Algeria against the grain pests, is evaluated using two biochemical parameters, glutathione-S-transferase and cholinesterase. Tadpoles (*R. saharica*) are subjected to different concentrations (25, 50, 75 and 100ppm) of ARTEA 330EC. The results show a significant decline of average weight and average sizes of exposed specimens. At the same time, monitoring of biochemical parameters showed a sizeable stimulating protein (Synthesis) associated with stimulation of GST activity parallel to a decrease in the average rate of GSH. Measuring acetylcholinesterase activity shows a marked stimulation of the three fungicide concentrations (25, 50 and 75ppm). In conclusion, the results obtained in our work may suggest that the increase in GST observed associated with inhibition of acetylcholinesterase activity can be considered as biomarkers of toxicity 330EC Fungicide ARTEA in tadpoles of *R. saharica*.

PP-093

**Post-Deposition Hydrogen Treatment Effect on Surface Roughness and Hydrophobicity of Amorphous Silicon Films**

*Yamina Brahmi, Larbi Filali, Jamal Dine Sib, Yahya Bouizem, Djamel Benlekhal, Aissa Kebab, Larbi Chahed*  
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Amorphous silicon films were deposited by radiofrequency (rf) magnetron sputtering. Then, the films were treated by pure hydrogen gas at different pressures (1, 2 and 3 Pa) for 20 min, to investigate its effect on surface hydrophobicity (or un-wettability) and roughness. Fourier transform infrared-attenuated total reflection (FTIR-ATR) spectroscopy was used to evaluate presence of Si-H bonds at the surface. Results obtained by the atomic force microscopy (AFM) showed a sharp decrease (the non-treated film had a root mean square value of 81.74 nm, which then dropped significantly to 13.02 nm

for the 1 Pa hydrogenated film) in surface roughness as a result of hydrogenation. Optical transmission results revealed that optical properties were not affected. Contact angle measurements showed an enhanced hydrophobicity by 15 degrees for the 1 Pa hydrogenated film, and then it decreased for the 2 Pa and 3 Pa hydrogenated films. This result indicates that the decrease in roughness compromised the hydrophobization process.

PP-094

**Effect of Hydrogenation of Amorphous Silicon Surfaces on Protein Adsorption**

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We studied in this work, the adsorption of proteins on thin layers of amorphous silicon, depending on the surface conditions. We have a set of samples of sputtered silicon thin films, with different hydrogen concentration at the surface. Infrared spectroscopic analysis with the ATR method, ellipsometry and scanning electron microscopy revealed that the adsorption on the surfaces is enhanced on samples with highest hydrogen surface concentration. This result leads to the conclusion that the adsorption is caused by hydrogen bonds at the film / protein interface, which seems to be the dominant effect compared to surface roughness and wettability, which were found to decrease as hydrogen surface concentration increases.

PP-095

**Structural Studies of Hydrogenated Silicon Films Prepared by RF Magnetron Sputtering**

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Hydrogenated nanocrystalline silicon films have become the subject of great attention due to their remarkable properties for microelectronics and solar cells technology. The structural changes in intrinsic silicon thin films deposited by radiofrequency (rf) magnetron sputtering at room temperature ( $T_s = 35^\circ\text{C}$ ) are investigated as a function of the rf-power. The aim of this work is to get more insight into the effect of the rf-power. By varying the rf-power from 200 W to 500 W, and keeping all other parameters of the plasma constant (the total pressure is fixed at 4 Pa, the plasma gas mixture of 30% Argon and 70% H<sub>2</sub> and the target-sample holder distance of 50 mm). The composition and the microstructure of the films were analysed by X-ray diffractometry (XRD), atomic force microscopy (AFM), optical transmission measurements (OT) and spectroscopic ellipsometry. The results indicate that the films have nanocrystalline structures and the grain size decreases (5 to 2 nm) with increasing rf-power (200 to 500 W). The crystals are oriented generally towards the (111) plane, parallel to the sample surface. Analysis of the surface layers reveal that the Root Mean Square (RMS) surface roughness for the samples increases (11 to 43nm) with increasing rf-power and the film thickness grows (1.4 to 3.7 $\mu\text{m}$ ).



PP-096

**LSDA and LSDA+U Investigation of Optical and Magnetic Properties of ZnO**

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We present in this study the calculation of (TM) doped ZnO in the wurtzite structure using a supercell of 32 atoms. Diluted magnetic semiconductors (DMSs) are very interesting materials subjected to their promising applications to Spintronics, density-functional theory in the standard local-density approximation (LDA) proves to be problematic. This can be partly overcome by including local Hubbard U corrections (LDA+U). In this work, we present the influence of the Hubbard coefficient for optical properties of Co, Fe, and Mn doped ZnO. We show that the local spin-density approximation (LSDA) has severe drawbacks like a spurious Drude-like peak and a wrong position of the 3d bands which may be repaired by the LSDA+U method. We show the density of state, absorption coefficient, imaginary part of dielectric function and appearance of new peaks in the optical conductivity related with the magnetic impurities which we analyse in detail.

PP-097

**Mechanical and Microstructural Study of Photo-Aged Low Density Polyethylene (LDPE) Films**

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This study deals with the ageing of Blown extruded films of low-density polyethylene, used for green house covering. The LDPE have been subjected to climatic ageing in a sub-Saharan facility at Laghouat (Algeria) with direct exposure to sun. The microstructural changes in the films were analyzed by IRFT for different states of ageing. The mechanical characterization was performed on a uniaxial tensile apparatus. The mechanical properties such as Young's modulus, strain at break, and stress at break have been followed for different states of exposure time (0 to 6 months). The Climatic ageing of LDPE films shows the effect of ageing on the microstructural Plan which leads to: i) To an oxidation of the molecular chains. ii) To the formation of crosslinkings and breaking chains, which both of them are responsible of the mechanical behavior's modifications of the material. Crosslinks are in favor of strengthening of the mechanical properties at break (increase of  $\sigma_r$  and  $\epsilon_r$ ). In other side the chains breaking leads to a decrease of these properties. The increase in the Young's modulus also seems to be related to those structural changes since the crosslinks increase the average molecular weight.. Branchings and tangles are favorable pairs for the ductile nature of the material. And in other side the chains breaking reduces the average molecular weight and therefore promotes the stiffening (following to morphological changes) so the material becomes fragile. The post-mortem analysis of the samples shows that the mechanical stress has an effect on the molecular structure of the material. Although if quantitatively the concentrations of different chemical species exchanges, from a quantitative point of view only the unsaturations raises the polemics of a possible microstructural modification induced by mechanical stress applied during the tensile test. Also we recommend a more rigorous analysis with other means of investigation.

PP-098

**Cyclohexanone Formaldehyde Resin/Clay Nanocomposites**

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In this study, in situ modified cyclohexanone formaldehyde resin (CFR) was prepared from clay (montmorillonite (MMT) and sepiolite (Sep.)) and alendronic acid in the presence of base catalyst. Different clay contents (from 1 to 20 wt%) were used to produce clay / alendronic acid /clay-alendronic acid modified nanocomposite ketonic resins. The polymeric nanocomposite material prepared by this method is directly synthesised in one step. These nanocomposites were characterized with Fourier Transform Infrared Spectroscopy (FTIR-ATR), Nuclear Magnetic Resonance Spectroscopy (NMR), X-ray Diffractometer (XRD) for structural analysis, Differential Scanning Calorimetry (DSC) and Thermogravimetric Analyzer (TGA) for thermal analysis.

PP-099

**A Spectroscopic Analysis of the Weathering Effects on Low Density Polyethylene**

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The weathering of low density polyethylene film used as greenhouse covering has been carried out in sub-Saharan region. UV spectroscopy analysis has revealed the presence of chromophoric structures responsible in part of the photosensitivity of the polymer toward UV light. In fact, the conjugated bonds (diene) being photosensitive are regarded among others as good initiator to the photooxidation process. An ATR-FTIR analysis has allowed the identification of these photochemical products essentially developed on the surface of the film.

PP-100

**Polymer Based Skin Phantom**

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Phantoms are usually used to simulate body parts in the laboratory testing. New products or materials particularly for imaging system can therefore be tested over and over again for further improvement and analysis. Due to high cost and impossible replication of each body part biologically, physical and electronic parameters are widely accepted, instead, to be used in medical imaging analysis. In this study we have developed skin phantom based on the mixture of polymer and nanoparticle. Nanoparticle has been used as an ingredient to alter the electrical properties of the phantom. The thickness of the phantom is approximately 0.15 mm. The phantom is in the form of thin film. It is flexible, reusable and durable. The electrical properties (eg; permittivity, conductivity etc) are characterized using chemical impedance analyzer. Increment in permittivity and conductivity is found to be proportionate to the concentration of nanoparticle in the phantom.

PP-101

**Contribution to the Study of the Behavior of Slag Sand to Shearing**

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Slag sands (SS) are materials used in road engineering. They can be defined as the mixture of one (or several) sand (s), a percentage of vitrified slag (granulated or pelletized) and 1% of a basic activating. They are mainly used in the manufacture of the foundations of semi-rigid pavements. The slag is an industrial waste obtained during fusion of the inert parts of ore (gangue) and fluxes (limestone) which we added in the charge of the blast furnace for elaboration of cast iron. At the outlet, the slag is in the form of a liquid at a temperature of about 1450 ° C, isolated and rejected from the cast iron by flotation. Since the density difference between the cast iron (7) and the slag (3), they are separated by decantation. The use of slag sands (SS) in the field of Civil Engineering is a very interesting way of recovery. Indeed, while the amount of blast furnace slag and sand dune is becoming increasingly important, the materials used in public works become scarcer.

This work contributes to the study of mechanical behavior of slag sand to shearing and determining the mechanical characteristics such as cohesion and friction angle through shear tests. The triaxial test is the laboratory test most used to study the mechanical behavior of soils. This test consists in subjecting a cylindrical specimen of material a uniform stress field defined by a hydrostatic pressure in the horizontal plane and a stress created by a press.

PP-102

**Market Growth Potential Analysis of LED Lens Compound**

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LED lens compound is used for LED lighting chip packaging cap. Its main role is to protect the inner part and to disperse light brightly. It should not be deteriorated under the long-term high temperature. In order to have mechanical strength, epoxy resin as a LED lens should have high purity with a minimal amount of chlorine. Among LED-related markets, LED lighting field is expected to show the most significant growth since a number of countries try to reduce energy consumption and to have eco-environmental regulation, and the prices of LED lighting keep decreasing. LED lighting world markets are forecast to reach 160.3 billion US dollars in 2017 from 69.4 billion US dollars in 2012 with 17.3% CAGR (compound annual growth rate). So far, LCD BLU and lightings for auto vehicles have been the main portion of the market, but general lighting market is expected to grow bigger than other fields. The revenue for lighting among LED businesses of major LED companies gets to increase. The market size of LED lens is forecast to reach 2.11 billion US dollars in 2016 from 1.02 billion US dollars in 2012 with 20.8% CAGR. In case of silicon materials, Dow Corning has released 5 new products of next generation LED encapsulants with various hardness. The major LED element companies are Nichia, Toyota Kosei, Philips Lumileds, Cree, Osram, which lead the LED market. LED packaging industry is lead by Nichia, Osram, Cree, Toyota Kosei, and Philips Lumileds. Nippon Light and OPT are the major companies in LED BLU. Cree has tried to expand their business models to LED lighting finished products from LED packaging. The revenue for Lighting business of Philips has been increasing compared to other parts in Philips, especially industrial light business.

PP-103

**Effect of the Surface Treatment and the Content of Nanofiller on the Properties of PP/SiO<sub>2</sub> Nanocomposites Prepared by Melt Mixing**

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In recent years much research has been undertaken towards polymer nanocomposites by adding nanoparticles to polymer matrices. Indeed, such materials were shown to have improved mechanical properties, thermal stability and flame retardant characteristics at low filler concentration as compared to conventional microparticulate composites. This is due to smaller particle dimensions which lead to higher specific surface area and a greater amount of interphase in a composite. The objective of this work is the preparation and characterization of polypropylene/silica (PP/SiO<sub>2</sub>) nanocomposites by mixing in the melt state in an internal mixer. The effect of surface treatment of silica gel and the content of nanofillers (3% and 5%) were evaluated in order to understand the mechanisms of dispersion and quality of the polymer-filler interface. The compounds were investigated by transform infra red spectroscopy (FTIR), and optical microscopy, The thermal and mechanical characterization of the samples were also evaluated to determine a material with optimal properties. The results showed an increase of the Young modulus by using 5% of fumed silica and treated silica gel. An improvement in all mechanical, thermal, morphological and rheological properties is observed by the introduction of 5% of the treated agent.

PP-104

**The Effect of Terpeneol Addition on Characteristic Properties of the CIGS Thin Film**

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In this study, Cu(In, Ga)Se<sub>2</sub> (CIGS) thin films were prepared by sol-gel dip-coating technique. For this purpose, copper nitrate hydrate (Cu(NO<sub>3</sub>)<sub>2</sub>.3H<sub>2</sub>O; 99.999 %), indium nitrate hydrate (In(NO<sub>3</sub>)<sub>3</sub>.3H<sub>2</sub>O; 99.999 %), gallium nitrate hydrate (Ga(NO<sub>3</sub>)<sub>3</sub>.H<sub>2</sub>O; 99.9 %) and SeO<sub>2</sub> (Merck; 99.9%) were used to produce the CIGS solution. Terpeneol and Ethyl-cellulose were used to produce a viscous solution. The effect of the addition of terpeneol on the adhesive of the sol-gel derived Cu(In, Ga)Se<sub>2</sub> was examined with considering the characteristic properties. The changes in pH value was controlled with the addition of terpeneol to obtain transparent, and homogeneous solution. The addition of terpeneol to the solution improved the optical properties of the CIGS thin film with the changes in the surface morphology. The solution properties were investigated by TG (Thermogravimetry) and DTA (Differential Thermal Analysis). The films were characterized by using X-Ray Diffractometer (XRD), a scanning-electron-microscopy (SEM), an atomic force microscopy (AFM), X-Ray fluorescence (XRF), UV/VIS spectrophotometer and four point resistivity probe.

PP-105

**Synthesis, Magnetic and Dielectric Characterization of implanted spinel ferrite nanoparticles**

*Harun Bayraktar*

Co and Mn implanted Fe<sub>2</sub>O<sub>4</sub> spinel ferrite nanoparticles were synthesized through the cetyltrimethylammonium-assisted hydrothermal route using NaOH. Nanoparticles were found to have a crystalline structure and high phase purity from the x-ray diffraction measurements. In addition, the x-ray diffraction results also indicated that nanoparticles showed a spinel cubic structure. Magnetic parameters of the nanoparticles were measured by a vibrating sample magnetometer (VSM). It was revealed that the magnetic parameter properties changed depending on temperature and cobalt concentration. Magnetization measurements showed that an increase in the Co content of the nanoparticles

and a decrease in the temperature resulted in an increase in the coercivity of the nanoparticles. Furthermore, I investigated the theoretical and experimental dielectric behavior of Co and Mn implanted Fe<sub>2</sub>O<sub>4</sub> spinel ferrite nanoparticles. The variation of complex dielectric permittivity at room temperature with frequency in the range of 1MHz–3GHz was studied. The permittivity displayed atomic polarization and electronic polarization in this frequency range.

**PP-106**

**Effective Atomic Numbers and Mass Attenuation Coefficients of Some Compounds of Lanthanides for Total Photon Interaction in the Energy Region 1 keV - 1 GeV by Using Direct Method**

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Effective atomic numbers,  $Z_{eff}$ , and mass attenuation coefficients are very useful parameters used to characterise the radiation response of a multi-element material technical and industrial applications. These parameters provide fundamental data in relevant to fields if it are determined accurately. In the present study, the effective atomic numbers and mass attenuation coefficients have been investigated for some oxides of lanthanides by using a direct method for total photon interaction. And the results have been compared with experimental results.

**PP-107**

**Fabrication and Characterization of Silicon Nitride (Si<sub>3</sub>N<sub>4</sub>) Films by Plasma Enhancement Chemical Vapor Deposition (PECVD)**

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Silicon nitride (SiN) films were deposited on silicon substrate by plasma enhanced chemical vapor deposition (PECVD) by changing the silane (SiH<sub>4</sub>) and ammonia (NH<sub>3</sub>) flow rates in this thesis. Silane and ammonia were used as precursors for silicon and nitrogen. RF was used to create plasma in parallel-plate configuration. In the present study, the gas flow rates were varied during deposition while other parameters were maintained at constant value, temperature 300°C, RF power 15W, chamber pressure 1 Torr. For the optical features such as refractive index, absorption pikes, bond types in the SiN films were characterized by using ellipsometry and Fourier Transform Infrared (FT-IR) spectrometer. Refractive indices for SiN films with different ammonia to silane flow rate ratio were measured by ellipsometry. It was observed that refractive index increases as NH<sub>3</sub>/SiH<sub>4</sub> ratio decreases. The FT-IR spectra exhibit typical peaks corresponding to silicon nitride films. It can also be observed that the Si-N peaks increase as the NH<sub>3</sub>/SiH<sub>4</sub> ratio decrease by FT-IR spectra. This indicates that the SiN films will be utilized as an optical waveguides for optoelectronics applications.



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VP- 001

**Energy Consumption Model for Wireless Sensor Networks**

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Energy consumption and energy modeling are important issues in designing and implementing wireless sensor networks (WSNs) which help the designers to optimize the energy consumption in WSN nodes. Good knowledge of the sources of energy consumption in WSNs is the first step to reduce energy consumption. Therefore, an accurate energy model is required for the evaluation of communication protocols. In this paper new energy model including sources of energy consumption that are not included in previous energy models has been provided. The proposed model can be used to analyse the WSNs energy consumption, to evaluate communication protocols, and it can also use to estimate energy consumption and network lifetime which used for on-line energy accounting.

VP- 002

**Usage of EAN-13 Barcodes for Poke-Yoke Applications in Animal Feed Industry**

Alperen Ekrem Çelikdin  
TARFAŞ A.Ş.

With the wide usage of automation and control systems, feed industry seize the lean production opportunities. Poke-yoke is one of tools of the lean philosophy. For the sake of product differentiation and market segmentation, feed mills produce over 30 to 1000 sq's of products. This wide product range, increases the probability of defective product shipments, such as failure to pack the required feed type to desired sack. This paper aims to describe the research and developments carried out to prevent such failures by the suitable usage of barcodes and rapid scanners in the feed industry as a lean management tools. Results are effective, guarantees the customer satisfaction and eases the goods inventory management.

VP- 003

**Improving the Quality of Life of Patients Through the Use of Wearable Sensor Devices**

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Wearable devices for scanning vital functions can be great opportunity not only for real time examination, but also for future knowledge about disease and their progress. In the first part of the paper are some basic information about sensors, smart sensor networks and their applications in the real world, wearable technology, wireless technology, and home automation. In the work are showed some examples of commercial wearable devices. The main part of work is focusing on developing new solution for wearable ECG device. This device is more affordable than systems on the market now and it is about a half price than others, which is more appropriate for general population. Designed wearable device consists of microcomputer Arduino Uno, e health shield V2.0 developed by Cooking hacks, three ECG electrodes, Pulse and Oxygen in Blood Sensor (SPO2), communication shield, Wi-Fi module, composite hard case and external USB battery. The device is reading physiological signals, processed them, and thru Wi-Fi is sending them in free application for smart devices named e health, developed also by Cooking Hacks. This application can show values in real time and is capable of showing ECG curve in graphic interface. E health application is free for iOS and Android users. The device can be customized, and can include 5 more sensors. This solution can get real-time information about patient health during ordinary day habits, when they experience more physical activities, or in dangerous situations. In the future similar devices can create the base for massive health scanning sensor network what could be reflected in improving the quality of life of patients.

VP- 004

**Cyberpunk Vision and Human Manipulation in Don DeLillo's Point Omega**

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Seemingly late capitalism has been faced with a dead end in the twenty-first century, while technology has been continuing to its remarkable developments. Today, people are using not only laptops, iPhone and iPad tablet computers, but also Facebook, Twitter, and other social networks are becoming a part of their everyday life. It goes without saying that we are living in a techno-capital era. Thus, it seems significant to investigate how we have been influenced by technological advances in the area of media and communication since the late twentieth century. Technology has been an area of interest in literature. Representations and imageries of technology reflect the political ideals and cultural perspective about it. Since the late twentieth century the dystopian reflection of technology has occurred in cyberpunk narratives that depict a kind of environment characterized by darkness, chaos, violence, anarchy and paranoia. Thus, in the early of the twenty-first century surrounded by information technologies manipulating and modifying consciousness using electronic and magnetic tools or chemical compounds, it is significant to see how cyberpunk narratives represent the human manipulation. The present study aims to examine Don DeLillo's Point Omega to show the formation of a new subjectivity that is strictly shaped and the manipulated in cyberspace.

VP- 005

**ICT in Teaching/Learning Literature: The Case of English as a Foreign Language**

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This paper aims to seek the real impact of ICT in teaching/learning literature; it focuses mainly on the strong sides of ICT in enhancing learners' motivations and autonomy in reading books, short stories, novels, as well as their readership. The paper seeks also the ways and means used by teachers in order to make literature more attractive by creating funny environments with ICT tools. The students' reaction towards ICT will be also mentioned in this paper and how they enjoy the new way of learning literature. At the end, ICT in teaching/learning literature examines the main reasons that affect the uses of ICT in teaching foreign literature and why some teachers and learners fear technology.

VP- 006

**Digital Badges for STEM Learning: Fostering Creativity, Innovation and Development of Transferable Competencies**

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The need for knowledge in science, technology, engineering, and math (STEM) disciplines continues to increase and in fact there is a deficit of workers with expertise in these fields (United States Department of Commerce a, 2012; U.S. Department of Commerce b, 2012; Gmür & Schwab, 2014). Developments in ICT technologies have also precipitated significant change in the processes and systems of non-STEM workplaces. The result is an increased demand for STEM skills, particularly those associated with creativity, invention, and complex problem-solving. There is significant concern about the deficit of skilled STEM workers and its impact on innovation and nations' abilities to compete in the global marketplace (Bosworth et al, 2013). Furthermore, there are indications that current educational outcomes do not adequately meet workplace needs. As the world economies become more interconnected, international comparison of workers' preparation is becoming increasingly important. Methods to compare and articulate skills sets across countries would facilitate that process. The emerging boundary concept of digital badges is an innovative practice of micro-credentialing and communication of skills and knowledge. Using a competency-based model, digital badge criteria can be transparent and content agnostic; they can scaffold, acknowledge and communicate STEM competencies gained within various formal and informal learning contexts.

The use of digital badges as a learning intervention, is an emergent area of research. Funded by the National Science Foundation to explore “Badge-based STEM Assessment,” Risconscente et al. (2013) reported that there are “novel affordances badges bring to the current context of STEM learning.” In the proposed session, innovative research to determine the impact of a digital badge intervention upon student learning in STEM content will be shared. The study occurred in a formal learning context with middle and high school students. The digital badge assessments were aligned with standards in science, math and language arts.

**VP- 007**

**Comparing the Emotions of Entrepreneurship and Innovativeness for Turkish and English**

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In this article we have tried to identify the emotional composition of entrepreneurship and innovation. To get this we studied approximately 60.000 tweets in Turkish and English. Second purpose of this research is comparing the emotional compositions of entrepreneurship and being innovative for Turkish and English tweets.

We have used 13.000 Turkish and 13.500 English tweets containing “Entrepreneurship” keyword and 14.500 Turkish and 15.000 English tweets containing “Innovation” keyword for research.

Sentiment Analysis(SA) of emotions conducted for this research. In SA we have used Mohammad’s emotion lexicon containing 6.468 words matched with 8 emotions (Anger, Anticipation, Disgust, Fear, Joy, Sadness, Surprise and Trust) and 2 polarities (Negative and Positive). This lexicon has used Ekman’s classification of emotions.

In Turkish tweets of entrepreneurship contains mostly the words of “anticipation” besides this the tweets of innovation in Turkish contains mostly the words of “trust” and the both contains the words of the “surprise” fewest. The constraints of the research are the limited number of tweets used for research and the selection method of tweets has its own uncertainty. While using Mohammad’s emotion lexicon we ignore the structural and cultural differences of Turkish and English languages.

Identifying the emotional composition of Entrepreneurship and being innovative provides the fast detection of candidates and gives information about the designation of the required environment for developing the entrepreneurial and innovative behaviours. This research adds a different point of view for the researchs of this area.

**VP- 008**

**Poverty and Social Exclusion Versus Labor Market in the EU Member States**

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The achievement of the main goals of the Europe 2020 strategy on the field of social cohesion is closely related with the poverty reduction. The number of people at risk of poverty or social exclusion should be reduced by 20 million by 2020 compared with 2008. The number of people at risk of poverty or social exclusion accounted for 116.6 million in 2008. Unfortunately in 2013 this number increased in EU-27 to 121.6 million (in EU-28 including Croatia, the newest Member State of the EU, the number of people at risk of poverty or social exclusion reached 122.9 million). In 2008, the distance between the countries with the lowest (14.9 % in the Netherlands) and the highest (44.8 % in Bulgaria) risk of poverty levels reached about 30 percentage points. In 2013, this gap had grown somewhat to 33.4 percentage points, with the lowest level reached in Czech Republic (14.6 %) and the highest level reached again in Bulgaria (48 %). One of the main impacts of the economic crisis is the increase of unemployment rate of the labor force. Unemployment is nowadays a permanent social reality with the consequence that people without a job usually cannot lead a life which fits the societal standards for material and social well-being. Especially the unemployment rates of young people tend to be higher than among the general population and so youths aged 15 to 24 years are in serious risk of social exclusion. The paper will focus on a detailed analysis of the

association between the poverty and social exclusion measures and the labor market indicators of the EU Member States.

**VP- 009**

**The Future of Social Innovation: Triggers, Best Practices and Frequent Mistakes, Based in Spanish Cases**

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The current context is a context of uncertainty, change and enormous challenges for those who work from whatever the field, in the fight against poverty and exclusion and for a better, more just and more human world for all human beings.

The reduction of resources for social needs attention both publicly and through Civil Society Organizations, the increasing of social needs of individuals and groups who suffer and the insufficient impact of projects, programs and policies aimed at reducing poverty, exclusion, inequality in the world are key factors to define the context.

Given the context described above and the certainty that they will but to intensify in the coming years, Social Innovation, seems a way in which it might be worth to work further.

The paper trays to show and share some conclusions the research on Social Innovation, being holded by Mrs Blanca Herrero de Egaña is giving away. Analyzing many Social Innovation projects in Spain, Europe and all over the world, data shows that there are some triggers, some frequent mistakes, and some best practices, which diffusion could be useful for other innovators or the future of Social Innovation.

**VP- 010**

**The Effects of Technological Innovation Policies on the Turkish Labor Market**

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This paper intends firstly to define the technological innovation policies and specify the major tools of the technological innovation policies such as improving research and development policies and general and vocational education of the labor force to ensure structural adjustment of labor to advanced use of technology. After the use of information and communication technologies in the production process, the importance of skilled labor has increased. As a result, technological innovation policies depends on the investment in the research and development policies and human capital. After defining the technological innovation policies, this paper aims to point out the technological innovation policy implementations in developed countries and in Turkey. Innovation activities mainly concentrates on the countries with strong capital. Thus a distinction between technology-producing countries and technology-purchasing countries has emerged. Turkey, as a developing country, has increasingly applied technological innovation policies. Hence, the transformation of the Turkish economy with the use of technological innovation policies, also has many effects on labor markets. The main problematic of this paper is to analyze the effects of technological innovation policies and the transformation which the information and communication technologies created on the Turkish labor market especially on the industrial and services sectors. As a result, this study will evaluate the Turkish labor market from an innovative perspective. Besides the effects of technological innovation policies on the productivity of labor will also be evaluated throughout a sectorial aspect.





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## OFP-001

**Adjusting the Strength of Intellectual Property Rights to Allow Healthy Competition**

Shinto Teramoto

*Professor of Law, Kyushu University, 6-19-1 Hakozaki, Higashi-ku, Fukuoka 812-8581, Japan***Abstract**

The legal protection of a technology by means of patents and other intellectual property rights (“IPRs”) gives the right holder the power to exclude its competitors in the market where the products and/or services embodying such technology are diffused. Each supplier in the market faces the uncertainty of whether it can survive the competition. However, IPRs are likely to encourage the right holder to enter the market and become the forerunner, by alleviating such right holder’s uncertainty. It is likely that some of the followers, including local entrepreneurs in developing countries, may improve the forerunner’s technology and implement such improvements in better products or services. However, it is also probable that the IPRs of the forerunner will inhibit the further advancement of technologies and products or services, by obstructing the activities of the innovative followers in the market. The author assesses the degree of negative impact of the forerunner’s IPRs that inhibit any healthy competition between the forerunner and the followers by using a simple network model, which comprises of consumers and competing suppliers. Moreover, based on the analysis using the said network model, the author discusses how we can design an intellectual property law scheme that can restrict the disadvantages caused by IPRs, while maintaining their advantage in encouraging entrepreneurs to enter the market. By means of a discussion using a network model that represents the specific aspects of the market, the author tries to assess the pros and cons of IPRs, especially in the markets of developing countries. The discussion suggests that the strength of IPRs should be adjusted to allow healthy competition between the forerunner and followers in order to give a reasonable degree of benefit to consumers.

**1. The pros and cons of legal protection of intellectual property - from the perspective of developing countries**

Many laws declare that the purpose of protecting technology by means of patents and other intellectual property rights (“IPRs”) is to promote the development of industry and/or social welfare. For example, Article 1 of the Patent Act of Japan (Act No. 121 of 1959, as amended) states “The purpose of this Act is, through promoting the protection and the utilization of inventions, to encourage inventions, and thereby to contribute to the development of industry.” The United States Constitution states, in Article I, Section 8: “The Congress shall have power: To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries”.

However, some of the countries, that are now characterized by their higher degree of intellectual property protection and their continuous and sophisticated development of industry were, in the past, reluctant to give protection to imported intellectual products. For example, “The first Copyright Act covered just maps, charts, and books. It gave authors an exclusive right over printing, reprinting, publishing, and vending only. Works were protected for just fourteen years, renewable once, if the author was alive when the first term expired. And works were only protected if they were registered, if the author deposited copies with an appropriate depository, and if the author was American. Our outrage at China notwithstanding, we should not forget that until 1891, American copyright law did not protect foreign copyrights. We were born a pirate nation.”<sup>1</sup> Japan “reluctantly” entered the Berne Convention for the Protection of Literary and Artistic Works and the Paris Convention for the Protection of Industrial Property, both in 1899. The stenographic record of the special committee that examined the bill of copyright act for the lower house of the 13rd Imperial Diet of Japan (“*Dai 13 kai Teikoku Gikai Shugi-in Chosakuken-hoan Shinsa Tokubetsu Inkai Sokkiroku*” available at <http://teikokugikai-i.ndl.go.jp/SENTAKU/syugiin/013/5278/main.html>) shows that the Japanese government at that time was obliged to give legal protection to foreign inventions and works of authorship for the purpose of demanding the developed countries (at that time) remedy unequal trade treaties. Also, according to this record, the Japanese lawmakers at that time rightly presented their concerns about the disadvantage caused by IPRs in importing and reproducing foreign creative products, while pointing out the said *pirating* experience of the United States.

These facts pose the frequently asked question - do IPRs promote the development of industry? Especially, do IPRs deprive the disadvantaged player in the market, such as the domestic supplier of a developing state, of the chance to come from behind to beat the advantaged player, such as the multinational business giant? Or, in contrast, do IPRs give the disadvantaged player the chance to overcome the giant?

**2. Possible Perspectives to devise a model to estimate the advantage of the respective suppliers in the market****A. A market perspective**

A potential entrepreneur, who intends to create a new market for products or services (hereinafter, simply referred to as “products”) embodying new technology, always faces the uncertainty of not knowing whether she will be able to survive the competition when followers enter the same market. However, suppose that she has a patent right or other IPRs that protect the said technology. Such rights give her the power to exclude competitors from the relevant market. Thus, IPRs, if granted to entrepreneurs, are likely to “nudge”<sup>2</sup> those entrepreneurs to enter the market to become the forerunner, by alleviating their uncertainty arising from competition<sup>3,4</sup>.

<sup>1</sup> Lawrence, L. (2003).

<sup>2</sup> Thaler, R. H., & Sustein, C. R. (2009).

<sup>3</sup> See Landes, W. M., & Posner, R. A. (1989).

<sup>4</sup> See also Teramoto, S. (2015).

However, we also have to take into consideration the possible innovations of the followers. The followers may innovate the technology originally developed by the forerunner, and the followers' products embodying such innovated technology may give consumers much greater benefit. However, if the forerunner's IPRs fix the market conditions by ensuring the forerunner's advantage, the followers would not have the opportunity to put themselves in a position to compete against the forerunner. If IPRs suffocate the competition in the market and deprive those players of the chance of generational change in products or suppliers, IPRs would be harmful to the development of industry. However, it would also be possible for followers to overcome their disadvantage in the market by cooperating with, or even beating, the forerunner using the IPRs of its own innovations.

For example, TOYOTA is known as the forerunner of the hybrid vehicle system<sup>5</sup> which has become very popular and very beneficial to consumers. However, there is much room for improving the gas mileage of the gasoline engine combined with the hybrid system. MAZDA has developed the leading energy-efficient engine technology ("*Skyactive Technology*")<sup>6</sup>. If MAZDA can improve the TOYOTA's hybrid system by combining it with MAZDA *Skyactive*, MAZDA can make its products much more appealing to consumers and strengthen its market position. Conversely, if IPRs protecting TOYOTA's hybrid system inhibit MAZDA from such improvement, TOYOTA is able to ensure its advantage in the market without increasing the benefit to consumers. In reality, fortunately for MAZDA and consumers, and also probably for TOYOTA too, TOYOTA decided to license its hybrid system technology to MAZDA<sup>7</sup>, MAZDA is now producing and selling automobiles employing TOYOTA's hybrid system combined with *Skyactive Technology*<sup>8</sup>. In addition, MAZDA agreed to produce and supply TOYOTA with automobiles powered by *Skyactive Technology*<sup>9</sup>.

## B. A network perspective

In order to discuss the relative advantage and disadvantage of the respective suppliers in the market, we have to employ a specific measure to estimate the degree of such advantage and disadvantage. Here, we are not talking about the current share of the respective suppliers in the market. Rather, we are talking about the future change of the respective suppliers' performance in the market. Therefore, the author, for the moment, assumes that a supplier having a probability of approaching a greater number of possible consumers to sell a greater number of products is deemed as having an advantage in the market, and *vice versa*.

Such probability may be increased or reduced depending on various factors. However, in light of the fact that such a vast amount is spent on advertising and more and more money is expected to be invested in advertisements<sup>10</sup>, the quality and quantity of information concerning the respective suppliers and their products transmitted to and received by their respective possible consumers would undoubtedly be one of the most important factors<sup>11</sup>.

Obviously, any information initially transmitted by an actor (for example, a supplier) is directly or indirectly (namely, through one or more actors) delivered to the receiver of such information (for example, a possible consumer), since it is almost impossible for any supplier to directly convey information of itself or its products to every possible consumer. Naturally, a supplier depends on the actors that have a greater capability to disseminate information among the consumers - mass media such as TV, radio, newspapers and magazines; influential consumers such as celebrities, evangelists and geeks; Internet search engines such as Google and Baidu; and social network services such as Facebook and Twitter.

If we deem a market as a simple competition between suppliers for their market share, the process of transmission, conveyance and dissemination of information concerning suppliers and products will be almost entirely neglected. However, if, by employing a social network perspective, we deem a market as a network graph that comprises of multiple nodes (denoting suppliers, consumers, media, etc.) and the connection between nodes, such process can be conveniently represented by the direct or indirect connections between the respective suppliers and possible consumers.

## C. Eigenvector centrality as an index

Suppose that we have the relevant market denoted as a network comprising of multiple nodes and the ties connecting nodes. Suppose also that a supplier's probability of approaching a greater number of possible consumers to sell a greater number of products largely depends on how the supplier is influential in the network so that it can make the information concerning itself or its products effectively reach the possible consumers.

Such influence can be roughly estimated by (i) how many possible consumers have direct connections with the relevant supplier, and also (ii) how many other influential actors in the network have direct or indirect connections with the relevant supplier (in *Fig. 1*, the blue node is connected with multiple nodes, some of which are also connected with other multiple nodes (having greater *eigenvector centrality*); while the green node is connected with only one other node (having less *eigenvector centrality*). Among the indices used to estimate the degree of the strength of the position of a node in a network, an *eigenvector centrality* is one of the most frequently used indices to estimate the influence of a node in the context of social network analysis<sup>12</sup>. In this paper, the author employs an *eigenvector centrality* of respective suppliers in order to estimate their relative degree of advantage and disadvantage<sup>13</sup>.

<sup>5</sup> See TOYOTA's technical information on its website ([http://www.toyota-global.com/innovation/environmental\\_technology/hybrid/](http://www.toyota-global.com/innovation/environmental_technology/hybrid/)).

<sup>6</sup> See MAZDA's technical information on its website (<http://www.mazda.com/en/innovation/technology/skyactiv/>).

<sup>7</sup> See the press release by TOYOTA and MAZDA as of March 29, 2010 ([http://www2.toyota.co.jp/en/news/10/03/0329\\_2.html](http://www2.toyota.co.jp/en/news/10/03/0329_2.html)).

<sup>8</sup> See MAZDA's press release as of October 22, 2013 (<http://www.mazda-press.com/eu/news/mazda-to-exhibit-all-new-mazda3-powertrain-derivatives-at-tokyo-motor-show/>).

<sup>9</sup> See the press release by TOYOTA and MAZDA as of November 9, 2012 (<http://www2.toyota.co.jp/en/news/12/11/1109.html>).

<sup>10</sup> See, e.g., Carat's prediction (<http://www.dentsuaegisnetwork.com/media/dentsu-aegis-network-news/2015/2015-03-24>).

<sup>11</sup> Many other factors can also affect such probability. For example, the usability or quality of the relevant product itself is likely to induce consumers to decide by themselves to buy the product. However, if the information concerning such usability or quality of the product is not conveyed to and received by consumers, such factors cannot affect the behaviour of consumers. Therefore, when our purpose is to prepare a very simple model on which we discuss specific aspects (but, not all aspects) of the market, it would be advisable to focus on the diffusion of information of suppliers products.

<sup>12</sup> Bonacich, P. (1987).

<sup>13</sup> It should be noted that by employing one index for the purpose of convenience and simplicity, we inevitably neglect or underestimate several factors that are not substantially counted in the formula to generate such index. For example, innovators and early adopters tend to avoid purchasing products already popular among the majority. However, such behaviour and the supplier's ability to reach such class of consumers is not well represented by their eigenvector centrality.

Assuming that a given undirected graph has number of nodes; is the adjacency matrix of ; is an element of ; and is the maximum eigenvalue of , the *eigenvector centrality of node* , is calculated as follows:

$$C_{ev}(i) = \frac{1}{\lambda} \sum_{j=1}^n a_{ij} C_{ev}(j)$$

### 3. Designing a model

Now, the author starts designing a very simple model (hereinafter, the “*Model*”) by which we can discuss the impact of IPRs in terms of the degree of advantage of the respective suppliers in a market. Due to its extreme simplicity, the *Model* proposed herein simply focuses on the impact of the position of the respective suppliers in the network representing a hypothetical market, and ignores any other factors that may affect the advantage or disadvantage of the respective suppliers. Therefore, it should be noted, as with any other models used to explain reality, the *Model* proposed herein explains only very limited aspects of the actual market.

The *Model* is prepared as a network that comprises of a specific number of nodes and their connections. The number of nodes (*size*) should be a substantial number to denote the dynamic development of a market. Here, the author determines size=64 for the purpose of convenience.

Although an actual market may contain various kind of actors, including suppliers, consumers, agents, advertisers, etc., the indispensable participants of a market comprise of multiple suppliers competing with each other and multiple consumers. For the purpose of simplicity, 2 nodes are nominated as suppliers, and the remaining 64 nodes are nominated as consumers.

In any market, the suppliers and the consumers are likely to be connected with each other directly or indirectly to a certain degree. For example, a consumer who purchases a product from a supplier can be deemed as connected directly with such supplier. A friend of such consumer can be deemed as connected indirectly with such supplier through the said consumer. However, it is not easy to devise the structure of such network, because it may vary depending on various conditions including the class of products, and the behavior of suppliers or consumers in a specific society. Therefore, for the purpose of convenience, the *Model* assumes that the default condition is a *random graph* comprising of the said 64 nodes, in which the probability that a tie exist between any pair of nodes is 0.05.

In order to denote the supplier that is more advantageous in the said default market, the node that has the maximum *eigenvector centrality* is chosen and named as  $S_f$ . In order to denote the supplier that is less advantageous in the said default market, the node that has the 5th maximum *eigenvector centrality* is chosen and named as  $S_s^{14}$  (in *Fig. 2*,  $S_f$  is denoted by the green node, and  $S_s$  is denoted by the blue node.).

Conventional IP debates have tended to implicitly assume that one consumer purchases only one product from only one of the two or more competing suppliers<sup>15</sup>. Truly, in the past, we often found such “*zero-sum*” phenomenon to which this assumption well fits. For example, a word processor user has the tendency to use only one product, which has resulted in WordPerfect being almost driven out of the market by MS Word. However, obviously, such assumption does not apply to every market. Nowadays, for example, quite a lot of users use Apple Keynote and MS PowerPoint simultaneously<sup>16</sup>. Therefore, the author introduced a variable (*cCapa*), which denotes the maximum number of units of products purchased by one consumer, to the *Model* so that it can represent both a conventional “*zero-sum*” market (*cCapa*=1), as well as the contemporary market in which a consumer possibly purchases multiple products of the same or similar kind from multiple suppliers (for the purpose of convenience, *cCapa*=64) (*Fig. 3*).

It is generally understood that a shorter distance between the transmitter and the receiver of information is likely to assure a better quality of communication<sup>17, 18</sup>. Assuming that the distance between a supplier and a possible consumer has an impact on the probability of a successful sale of products, which is represented by the establishment of a tie connecting the node denoting the supplier and another node representing the possible consumer, the *Model* is designed so that the probability of a supplier’s successful sale of products to a consumer gradually decreases according to the increase in the distance between them. In order to implement the said relationship between the probability of successful sales and distance in the simplest as practicable and convenient manner, the *Model* employs the concept of a time constant ( $\tau$ ) as follows:

- $\tau$ : the distance between two nodes, one of which denotes the relevant supplier, and the other denotes the relevant possible consumer.
- $\tau$ : a variable prefixed for each of the suppliers which is greater than 0.
- $P = e^{-\tau}$ : the probability that an *edge* (connection) is established between the said two nodes

Moreover, the larger  $\tau$  (in the *Model*,  $\tau=2$ ) represents stronger sales capabilities, and the smaller  $\tau$  (in the *Model*,  $\tau=1$ ) represents weaker sales capabilities (*Fig. 4*). The *Model* prefixes a certain values of  $\tau$  (“*f*” and “*s*”) to represent the sales capabilities of  $S_f$  and  $S_s$  respectively.

The *Model* denotes the exercise of IPRs by a supplier by cutting out the *edges* connecting the other supplier and consumers. The strength of the IPRs exercised by a supplier (*fForce* for  $S_f$  and *sForce* for  $S_s$ ) is denoted by the probability of such cut-out (in the *Model*, 0 for no exercise of IPRs; 0.2 for the exercise of weaker IPRs; and 0.6 for the exercise of stronger IPRs).

In reality, the consumers network dynamically develops by becoming more dense or more sparse. For example, a consumer who buys new mobile gadget may talk enthusiastically about the gadget to her friends and make the consumers network concerning the gadget more dense<sup>19</sup>. Alternatively, she may buy another gadget and may make the network concerning the former gadget more sparse. However, the *Model* does not implement such development of consumers network, that is left for future consideration. The *Model* implements only the development of a consumers network by means

<sup>14</sup> Although  $S_f$  is the less advantageous supplier, it is likely to have considerably higher *eigenvector centrality* compared with most consumers because  $S_f$  should have been making efforts to connect itself to consumers. On the other hand, the *Model*, has to make a clear distinction between the *eigenvector centrality* of  $S_f$  and  $S_s$ .

<sup>15</sup> See, e.g., Landes, W. M., & Posner, R. A. (1989).

<sup>16</sup> The assumption “You have to decide whether to prepare your half of the slides in PowerPoint or in Apple’s Keynote software” employed by Easley, D. & Kleinberg, J. (2010). *Networks, crowds and market*. New York: Cambridge University Press, p. 151, to explain coordination games shows that we often use both pieces of software.

<sup>17</sup> See, e.g., Bavelas, A. (1950).

<sup>18</sup> See, e.g., Borgatti, S. P. (2005).

<sup>19</sup> As to the *density* of a network, see e.g., Scott, J. (2013), *Social network analysis*, 3rd ed, p.69, London: SAGE.

of the suppliers' sales activities and the exercise of IPRs by the respective suppliers.

In the *Model*, in order to denote the continuous sales activities of the respective suppliers, as well as the continuous exercise of the IPRs by such suppliers, the default network is continuously modified as follows: at 1st instance, both  $S_f$  and  $S_s$  establish ties with other nodes at given probabilities calculated using  $f\tau$  and  $s\tau$  respectively (denoting their respective sales activities), while no such ties are cut out; and at each of the 2nd through final (in the *Model* used herein, 100th) instances, both  $S_f$  and  $S_s$  establish ties with other nodes at such given probabilities, and also the ties between  $S_f$  and other nodes are cut out at the probability of  $sForce$ , while the ties between  $S_s$  and other nodes are cut out at the probability of  $fForce$  (denoting their respective exercise of IPRs).

#### 4. Examples of Models<sup>20</sup>

The author assigned several sets of values to the said variables to derive examples of *Models* that were likely to represent the competition between suppliers in a market under specific combinations of conditions. The author then examined whether  $S_s$ 's *eigenvector centrality* ( $evc_s$ ), which is lower in the default network, exceeds  $S_f$ 's *eigenvector centrality* ( $evc_f$ ). The table below shows the combination of variables used in the examples and their results. It should be noted that the same combination of variables does not necessarily produce the same result, because the connection between nodes and its cut out is not fixed. It is made only based on given probabilities. The results also represent nothing more than examples.

Even within the limited examples shown in the *table*, there are several characteristic results. If the sales capabilities of both  $S_f$  and  $S_s$  are not differentiated from each other; neither exercises IPRs; and there is ample room for  $S_s$  to sell products to consumers because each consumer possibly purchases multiple products of the same kind, it is no wonder that  $S_s$ 's *eigenvector centrality* has a good chance to catch up  $S_f$ 's *eigenvector centrality* (see example 1-1 ( $cCapa=64$ )) (Fig. 5)<sup>21, 22</sup>. Also, in the *model* in which  $S_s$ 's sales capability is stronger than  $S_f$ 's, and  $S_f$  exercises no IPRs,  $S_s$ 's *eigenvector centrality* is possibly able to overtake  $S_f$ 's (see example 3-1) (Fig. 6)<sup>23</sup>. However, when  $S_f$  exercises IPRs,  $S_s$ 's *eigenvector centrality* is possibly able to maintain its advantage (see examples 3-2 and 3-3) (Fig. 7). In contrast, even in the *model* in which  $S_f$ 's sales capability is stronger than  $S_s$ 's, when  $S_s$  exercises IPRs, it is possible that  $S_s$ 's *eigenvector centrality* could overtake  $S_f$ 's (see examples 2-4 and 2-5) (Fig. 8).

#### 5. Suggestions derived from Models and Future Developments

From the perspective of a developing country, products implementing new innovations tend to be initially distributed by foreign businesses or their importers, distributors or licensees. For example, in 1930, the total number of automobiles sold in Japan was 22,727, among which the number of imported completed automobiles was 2,591 and the number of automobiles assembled in Japan using imported components was 19,678, while domestic production of automobiles amounted to only 458<sup>24</sup>. Therefore, it is natural for such foreign businesses (including the domestic distributors contracted with them) have higher *eigenvector centrality* in the relevant market, while pure domestic businesses have much lower *eigenvector centrality*. On the other hand, it is also probable that the following domestic businesses would gradually develop their own technological as well as marketing capabilities, and become able to supply advanced products to consumers. It is natural for consumers to prefer such advanced products and the *eigenvector centrality* of the domestic businesses would increase gradually.

As suggested by examples 3-2 and 3-3, there is a certain degree of concern that the IPRs owned and exercised by the foreign businesses would enable them to maintain their comparative advantage, by obstructing the growth of the *eigenvector centrality* of the domestic businesses. The possibility of such IPRs inhibiting market dynamism may lead us to suspect that IPRs are detrimental to the development of domestic businesses in developing countries. However, as suggested by examples 2-4, 2-5 and 2-8, there is a possibility that IPRs, once acquired by the domestic followers, help their *eigenvector centrality* to overtake the foreign businesses' *eigenvector centrality*. Accordingly, unilateral resistance to stronger IPRs will be harmful to domestic businesses, while adjustments to the degree of protection afforded by IPRs, as a transitory measure to permit domestic businesses to catch up, could offer a practical solution.

<sup>20</sup> The code prepared in R language to implement the *Model* is disclosed at <https://sites.google.com/site/disclodingcodes/istanbul>

<sup>21</sup> In each graph, the green node denotes  $S_f$  and the blue node denotes  $S_s$ .

<sup>22</sup> Because the value of *eigenvector centrality* of each node in the network is normalized through dividing by the maximum *eigenvector centrality* of the nodes, the *eigenvector centrality* of the node having such maximum value is always 1.

<sup>23</sup> Fig.s 6 through 8 shows the case of  $cCapa=64$ .

<sup>24</sup> Automobile Business Association of Japan, History and future of Japanese automobile industry, Ministry of Commerce and Industry of Japan, engineering Bureau survey materials, cited in Japan Automobile Manufacturers Association Incorporated. (1988). *History of Japanese automobile industry*, p.14. Tokyo: Japan Automobile Manufacturers Association Incorporated.

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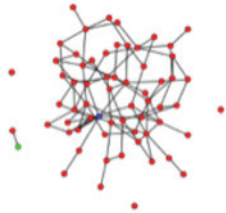
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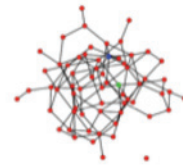
Table. *Models of a market in which a consumer buys only one unit of products (cCapa=1) and Models of a market in which a consumer may buy multiple units of products (cCapa=64)*

Code of example	fτ (S <sub>j</sub> 's sales capability) 1: weaker 2: stronger	στ (S' sales capability) 1: weaker 2: stronger	fForce (S <sub>j</sub> 's IPRs) 0: none 0.2: weaker 0.6: stronger	sForce (S <sub>j</sub> 's IPRs) 0: none 0.2: weaker 0.6: stronger	Eigenvector centrality after the 100th instance	
					cCapa=1	cCapa=64
1-1	1	1	0	0	evc <sub>f</sub> < evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
1-2	1	1	0.2	0	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
1-3	1	1	0.6	0	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
1-4	1	1	0	0.2	evc <sub>f</sub> < evc <sub>s</sub>	evc <sub>f</sub> < evc <sub>s</sub>
1-5	1	1	0	0.6	evc <sub>f</sub> < evc <sub>s</sub>	evc <sub>f</sub> < evc <sub>s</sub>
1-6	1	1	0.2	0.2	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> < evc <sub>s</sub>
1-7	1	1	0.6	0.6	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
1-8	1	1	0.2	0.6	evc <sub>f</sub> < evc <sub>s</sub>	evc <sub>f</sub> < evc <sub>s</sub>
1-9	1	1	0.6	0.2	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
2-1	2	1	0	0	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
2-2	2	1	0.2	0	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
2-3	2	1	0.6	0	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
2-4	2	1	0	0.2	evc <sub>f</sub> < evc <sub>s</sub>	evc <sub>f</sub> < evc <sub>s</sub>
2-5	2	1	0	0.6	evc <sub>f</sub> < evc <sub>s</sub>	evc <sub>f</sub> < evc <sub>s</sub>
2-6	2	1	0.2	0.2	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
2-7	2	1	0.6	0.6	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
2-8	2	1	0.2	0.6	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
2-9	2	1	0.6	0.2	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>
3-1	1	2	0	0	evc <sub>f</sub> < evc <sub>s</sub>	evc <sub>f</sub> < evc <sub>s</sub>
3-2	1	2	0.2	0	evc <sub>f</sub> > evc <sub>s</sub>	evc <sub>f</sub> > evc <sub>s</sub>

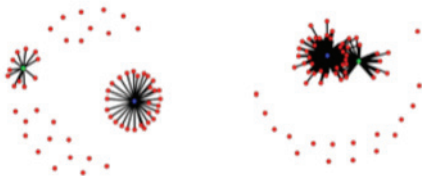
3-3	1	2	0.6	0	$evc_f > evc_s$	$evc_f > evc_s$
3-4	1	2	0	0.2	$evc_f < evc_s$	$evc_f < evc_s$
3-5	1	2	0	0.6	$evc_f < evc_s$	$evc_f < evc_s$
3-6	1	2	0.2	0.2	$evc_f < evc_s$	$evc_f < evc_s$
3-7	1	2	0.6	0.6	$evc_f < evc_s$	$evc_f < evc_s$
3-8	1	2	0.2	0.6	$evc_f < evc_s$	$evc_f < evc_s$
3-9	1	2	0.6	0.2	$evc_f > evc_s$	$evc_f < evc_s$
4-1	2	2	0	0	$evc_f > evc_s$	$evc_f > evc_s$
4-2	2	2	0.2	0	$evc_f > evc_s$	$evc_f > evc_s$
4-3	2	2	0.6	0	$evc_f > evc_s$	$evc_f > evc_s$
4-4	2	2	0	0.2	$evc_f < evc_s$	$evc_f < evc_s$
4-5	2	2	0	0.6	$evc_f < evc_s$	$evc_f < evc_s$
4-6	2	2	0.2	0.2	$evc_f > evc_s$	$evc_f < evc_s$
4-7	2	2	0.6	0.6	$evc_f > evc_s$	$evc_f > evc_s$
4-8	2	2	0.2	0.6	$evc_f < evc_s$	$evc_f < evc_s$
4-9	2	2	0.6	0.2	$evc_f > evc_s$	$evc_f > evc_s$



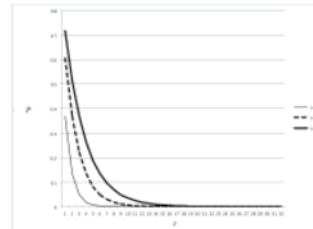
(Fig. 1) Nodes having greater or less eigenvector centrality



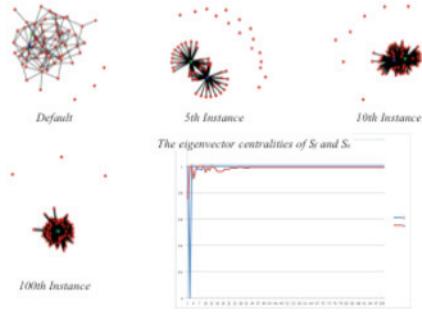
(Fig. 2) An example of a random graph prepared as the default conditions of a market



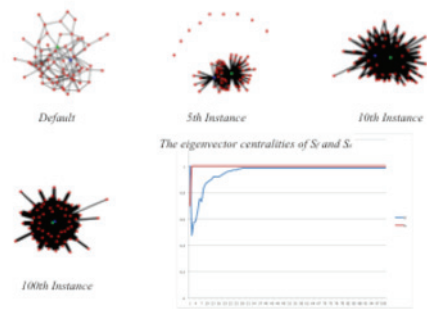
(Fig. 3) An example of a "zero-sum" market (left), and an example of a market in which each consumer buys multiple products of the same kind (right). Green and blue nodes denote suppliers in the market.



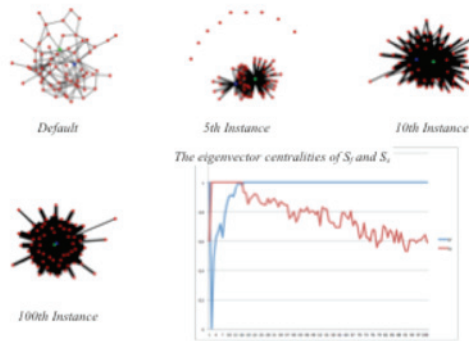
(Fig. 4) A greater  $\tau$  generates a greater  $P$ .



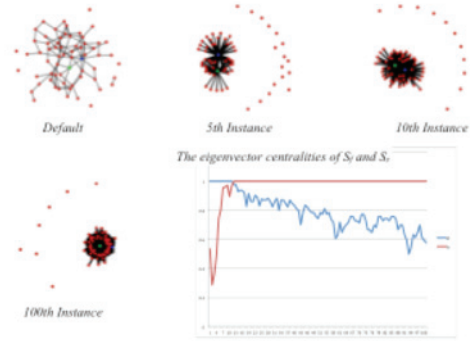
(Fig. 5) The development of the network in example 1-1 ( $cCapa=64$ ).



(Fig. 6) The development of the network in example 3-1 ( $cCapa=64$ ).



(Fig. 7) The development of the network in example 3-2 ( $cCapa=64$ ).



(Fig. 8) The development of the network in example 2-4 ( $cCapa=64$ ).



OFP-002

## The Influence of Green Trust, Green Self-Efficacy and Household Economy Towards Buying Green Behaviour in Malaysia

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### Abstract

As the continuous growth of global economy and fast pace technology changes, we are facing many issues on how to scale up the dissemination of environmental issues in Malaysia. In popular discourse, green idea provides the centre of sustainability importance, environmental knowledge and environmental concern are taken as good factors to influence the green buying behaviour. However in 2000s, the theories are weaken over years due to customer preferences, market and economic changes. Furthermore, environment concern and eco-literacy do not facilitated by the positive attitude, consequently, they are not willing to perform green buying behaviour. The realization of 'worth-to-buy green products come about when green products solve the individual concerns which driven by needs and wants. In contrast, prior studies indicated that customers are willing to pay more in saving cost and energy products. The inconsistency of attitude-behaviour derived from the intention novel which is the central focus of Theory Planned Behaviour. Hence, the study proposed an integration green drivers from Theory Planned Behaviour and Black Box model, namely; green trust, green self-efficacy and household economy to examine the impact of micro and macro factors which potentially stimulate positive relationship towards green buying behaviour. Hence, it is essential to investigate the green attitude-behaviour gap to flourish green market strategy in Malaysia.

### 1. Introduction

We are living in dangerous years where the world perceived ecology issues has arisen and climate change has alarmed the whole world. The scarcity of nature should have given us the good sign which shows us it is best to get involve to solve our environment degradation. Malaysia, like the other developing countries, we are awoken by devastating wastage and pollution issues. Although, we are among the earliest countries in the world that have taken a serious environment issues by enacting Environment Quality Act in 1974, however, based on Environmental Performance Index (EPI) stated that Malaysia was ranked 47 country compromised overall environmental score in the world in 2002. Historically, Malaysia EPI was gradually dropping to 50th in 2010 and currently in 51st place in the world. Based on the result EPI study (2014), Malaysia government has been practicing a better environmental health but few initiative on ecological vitality. Furthermore, green products are readily in the conventional market but the demand is not mature, adding to this, Cheah (2009) Chen and Chai (2010) indicated this poor green demand reflected by people who are still in the deep confusion on the green idea.

In general, consumers are doing more at the shelf than just checking the price, they become conscious on what ingredients, how and where the products are made. Today, they are driven by the curiosity and extra precaution to protect their health as well as their status. Customers who claimed as environmentalist are aware of the reputations of product manufacturers towards social and environment responsibility (J.Ottman, 2011). The past study in 1999 by Mitchell and Papavassiliou on green challenge stated that is hard for marketers to comfort the cutomers' decision making into the purchase action when it fabricated with confusion. The study supported by study Mitchell (2005), he said the confusion arises when the selection decision making process consists of three sources (1) over-choice of products, (2) similarity of products, (3) ambiguous of information. Over-choice of the products occur when a vast of relevant information, secondly, consumer is confuse when there are many similarity of products and third reason is when misleading, ambiguous or inadequate information conveyed via marketing communications. Turnbull (2000) define "green consumer confusion" as "consumer failure" to develop a correct interpretation of green product's preference during their purchase-decision process.

### 2. Literature Review and Hypotheses

#### 2.1. Green Phenomenon in Malaysia

The action-behavior gap issues have increased and scrutinize on the different relevant factors of motivating people to practice green buying, however, the degree of involvement has not yet met the desired realization. Although environmental initiatives exist within layers of government agencies and Malaysia's population, but there are still contradiction between attitude and behavior. According to Chan and Lau (2000), Paco (2009) and Ramayah (2010) indicated that the claims of awareness or the acknowledgement towards environmental issues does not guarantee the customer to purchase green product behavior, which means green buying behavior does not facilitated by the positive attitude towards environment. The finding supported by BC Tan and Chai Lau (2011) study on environmental attitude-green buying behavior in Malaysia, the result indicated that there is no significant relationship between attitude and behavior variables.

- *Attitude-Behavior Gap*

The equivocal results in the complex context of behaviour continuously arise the arguments on the circumstantial limitations of action and intention relationship which does not lead to actual behaviour. According to green expert J.Ottman, she said that people are potentially act on what's benefit or satisfied them, whereby they are seldom want to sacrifice for environment. This studies supported by Chatzidakis et al. (2007) study he suggested that consumers use neutralization techniques to justify their more selfish goals instead of purchasing fair products. This shows that individual is not always motivated to do something for which they lack the necessary resources (primary and selective motives) (Wilkie, 1990) and opportunities (self-benefits facilitate by immediate environment) (J. Moisaner, 2007), thus, to what extend they are going to act willingly or involve for the environment sake?.

#### 2.2. Conceptual Framework

Green buying is one of the specific activity in pro-environmental behaviour, which means the more specific the attitude measures, the stronger its correlation with the behavioural action. The purpose of this study is to examine customers' ability to depend on the products and to what degree of behavioural control will perform in influencing the degree of strength or direction of customer's motivation to engage in green buying. According

to Y.Kim (2005) pro-environmental behaviour is differ from general purchase-related customer behaviour. Thus, a conceptual model is proposed as integrated prominent predictors, which they are most likely influence green buying behaviour and promote economic of scale for future research.

According marketing strategy, it has micro and macro elements to influence customers to perform buying action. Microenvironment factors known as intrinsic variables which has discussed in Theory Planned Behaviour by Ajzen (1991) , it potentially influence buying decisions through the personal values and more complex towards the products for instance, behaviour, attitude, values, motivation and knowledge. These intrinsic variables discussed in The study will perform green trust adapted by Chen and Chai (2010) which refers how willing the person to depend on the green products and meanwhile, green self-efficacy novel is adapted from ground study of self-efficacy by Bandura (1982) which refers to perceived behaviour control.

Meanwhile, macro-environment is known as tangible groups which plays important role in the market, whereby it creates the opportunities of media, products, marketing intermediaries and price to influence the buying intention. It essential to conduct an investigation on external components as to signify the specific pro-environmental behaviour. The argument in the prior studies on the gap of attitude-behaviour is driven by an assessment of the benefit-cost, furthermore to what relevant degree of pressure to 'move' the customers to switch their commercial shopping products to more organic and environmental-friendly products.

- *Green Trust (GT)*

Confusion and mistrust arises when companies fail to communicate their environmental engagements and fail to develop correct interpretation or perception of various aspect of their products during information processing procedure (Peattie, 2009; Turnbull et al. 2000). Consumer's confusion creates misunderstanding of the green market when the products are too similar, too complex, too ambiguous and too much of information of the products (Mitchell and Papavassiliou 1999; Turnbull et al. 2000; Chen and Chang, 2013). Hence, this will raise their suspicions and undermine their trust (Singh and Sirdeshmukh, 2000) eventually this will stop them to purchase green products again.

Trust is a level of confidence towards another party would be behave expectedly (Hart and Saunders, 1997) ,in addition, trust is vulnerable intention to accept on positive expectations of the behaviors or intentions of the others (Raousseau et al.,1998) . Green trust defines the trustworthy or the feeling or an act of willingness to depend on products, service or brand based on beliefs or expectation resulting of its credibility, benevolence, and ability about its environmental performance (Blau, 1964; Ozanne; 1985, Ganesan; 1994).

The sustainability study from the J.Ottman (2011) shows that green trust is one the vital construct in producing environmental soundness products, where polls pointed out that people are willing to pay premium for a 'greenness of the products' such as Aveda, Toyota Prious, Burt's Bees and StoneyField Farm. The discussion in "The New Rule in Green Marketing" book (J.Ottman, 2011, pg 16), indicates that consumers now have higher expectation for the products and environmental soundness is a new dimension of quality that consumers seek. She said, consumers did not expect the ecological preference product will work well, but people tend to specify the products that they use and consume as a healthy products. For instance, a water-saving washing machine, energy-saving lamp and non-toxic pest control.

Nowadays, greenwash term is used to describe the practice of companies over claiming the environmental products that cannot be validated, it is widely applied to explain dishonest and misleading claims by companies (Parguel et al.,2011) which often result in suspicion and skepticism about green claims (Self et al., 2010). Thus, such claims and greenwash damage can lead to confusion and uncertainty towards the green products (Pomeroy and Johnson, 2009). The exaggeration of the environmental value on their products will arise suspicions which makes customers distrust and hesitate to buy, as a result, it will potentially destroy the green market in the future (Kalafatis and Pollard, 1999; Peattie , 2009 ; Polonsky, 2010).

Consumers are doing their own examine and rely on those products when they have sufficient level of assurance and reliance towards the greenness of the product. For example, eco-label is a statement or image that proven the products are green or bio-gradable, but the labeling program does not cover all aspects of natural characteristic in green product. Furthermore, many consumers agree that when companies are using "green" unto their products is often because for the sake of marketing strategy (Lyon and Maxwell, 2011). Hence, these unfavorable customer perceptions and high cost invested in developing green products might sabotage the whole green market (Hamann and Kapelus 2004, Chen and Chai, 2010), therefore , environmental movement will lose their progress support for the market towards sustainability (Gillespie, 2008). It is a crucial for firms to develop environment soundness products to help them to improve green trust as to reduce the green confusion, green perceived risk and greenwash (Chen and Chai, 2013).

H1: Green Trust affect Green Buying Behaviour

- *Green Self-Efficacy (GSE)*

In behavioral control is define as the ability or the self-evident, for instance, the individual has the adequate resources and opportunities to dictate the likelihood of performing the behavior (Ajzen and Fishbein, 1980). According to Bandura (2001), personal efficacy is essential because of its successful functioning regardless it is for individual or social working together and it does not focus on the reverence for individualism only. There is a wide range of self-efficacy discussing on individual's beliefs within his or her ability to perform given task and behavior, thus, an increase of self-efficacy expectations is able to increase the frequency of performance (Bandura, 1977).

According to this ground study of Self-Efficacy, it measures to what degree of engagement they will get involved and how long they will persist in facing obstacles or aversive experiences (Bandura & Adam, 1977). Hence, the level of self-efficacy is important factor in predicting the involvement of person to behave because it influences thoughts patterns, actions, and emotional arousal (Bandura, 1982).

Based on Kennedy et.al (2009) on environmental-values behavior gap survey in Canada, self-reported gap between priority of the environmental and environmental supportive behavior shows that people are constraint by green buying products because time and other resources meanwhile, distribution on "my impact on the environment is very low priority for me" and "I have oriented my entire lifestyle around my concern for the environment".

This study supported by self-determinant theory (SDT) by Ryan and Deci (2000), whereby it promotes the individual to seek information on environmental health risk which it will lead to more frequent environmental behavior. Osbaldiston and Sheldon (2003) study added that Self-determination theory also useful for promoting on environmental responsible behavior as the same self-efficacy perspective. For instance, participants who felt self-determined in their motivations seems to enter an 'upward spiral' of positive change (Sheldon and Houser-Marko, 2001), thus to maintain the good change is most likely to occur to those who have an internal factor like intrinsic motivation, believe and determination.

Moreover, Majlath (2010) said the beliefs of effectiveness of individual actions is one of the reasons to behave on a green way. In discussions of problems with the definition of 'self', it has been used to refer to several distinct phenomenon, including aspects of personality, the cognitive processes that underlie self-awareness, a person's mental representation of individuals, it also has an executive control centre that mediates decision-making and self-regulation (Olson 1999; Leary & Tangney 2003b).

Although, self-efficacy was found to have the strongest influence in pro environmental behavior, but the degree of purchasing the green products are still ambiguous. For instance, based on the organic purchasing studies have concluded the frequency of successful purchase is high when customers are likely to-do so (Kim, 2011; Chan Y.Ling, 2013) which means green purchasing behavior is high when other variables have direct correlation to purchase intention for green products influenced by peer or society pressure, environmental concern, government policy, health consciousness and price sensitivity.

H2: Green Self-Efficacy will affect Green Buying Behavior

- *Household Economy*

Taken by Customer Black Box Model (CBBM) on customer behaviour study, it assess the interaction of stimuli, customer characteristics, decision process and customer process (Sandhusen, Richard L, 2000). Economic environment is adapted from macro element and it can measured in the household context, for instance, the issue whether individual's behaviour is standing behind of their interests and values, or do it, for the reasons of external to the self (Johnson,1993). Futhermore, the price of the product strain on the individual budget, for example the price is high will charge a high financial risk on their household economy (Shukla, 2003).

The nature of believing they can make positive changes towards green environment stimulate the customers' tendency to checking and trying on few samples or read testimonials before they consume or buy which will going through buying process and spend fraction of time, energy, effort and money. Adding to this, the limitation of income provides the inability to engage or perform such purchase will likely to happen when the green products are expensive than traditional products. Based on environment-support behaviour (ESB) by Dunlap and Mertig (1995); Diekmann and Frazen (1999) stated that high-income versus low-income is one of indicators how individual express to support environment by green buying products. Lack of money can clearly preventing individual who hold environmental values from buying expensive green household products. Thus the price- income of household or personal financial positions them in desired buying lifestyle which does not aligned how high green values the customers perceived.

H3: Household Economy will affect the green buying behaviour

**3. Conceptual Framework**

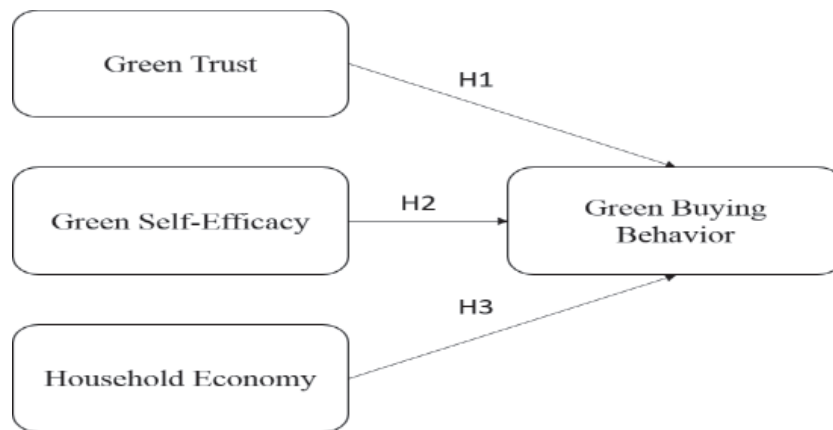


Fig. 1. Conceptual Framework

4. Methodology

- *Sampling Frame*

The future study will use social-survey questionnaire quantitative method with the Likert scale to test the hypothesis, running from 1 (disagree) to 5 (strongly agree), a self-complete or self-administer questionnaire where customers complete it by themselves (Bryman and Bell, 2011). The sample size consists of 500 respondents from combinations offline and online survey on green household products in Malaysia.

Table.1. Variable measurements

Variables	Questions	Sources
Green Trust	<ol style="list-style-type: none"> <li>1. I feel that this product’s environmental reputation is generally reliable</li> <li>2. I feel that this product’s environmental performance is generally dependable</li> <li>3. This product’s environmental concern meets my expectations</li> <li>4. This product keeps promises and commitments for environmental protection</li> <li>5. I feel this product’s environmental claims are generally trustworthy</li> </ol>	Adapted from Chen (2010)
Green Self-Efficacy	<ol style="list-style-type: none"> <li>1. I can make a difference in green buying product to solve environment problems</li> <li>2. I believe when I buy green products will help environment as a whole</li> <li>3. I believe I have the ability to make a good change by purchasing green products</li> <li>4. I have oriented my buying practice around my concern for the environment</li> <li>5. The impact on the environment is very high priority for me</li> </ol>	Adapted from self-efficacy Terry and O’Leary (1995), Manstead nad van Eekelen (1998), Armitage and Conner (1999), Kennedy (2009)
Household Economy	<ol style="list-style-type: none"> <li>1. I will still buy green products even it is pricy to protect environment</li> <li>2. My financial position is capable to buy green products as to support environment protection</li> </ol>	Norton (1998), Gelderman (2006), Walker and Brammer (2012) ,Meehan and Bryde (2011) , Adham and Siwar (2012)

5. Conclusion

The research has proposed that green buying behavior will affect Environment Performance Index in the future. The numerous western studies have found these three variables namely; green trust, green self-efficacy and household economy will affect green buying behavior but it remain equivocal in Malaysia context. Thus, an increasing environment pollution and wastage become major concern for Malaysian to sustaining a good environment for future generation. It is essential to gain understanding how these integrated green marketing (T.Rosli, 2015) variables to motivate customers start to use or consume ecological products and make green idea as a part of lifestyle which this pro-environment practice will start at their home.

6. Practical Implication of the research

The main goals for this research to help marketers to understand and channel their green products based on customers’ needs and wants which derived from complex behavior. Buying activities motivate the economy of scale of the country and flourish the better environment for the people. Therefore, marketers will be proactively produce actual demand market and engaged their customers in the outcome process. As the result, this will encourage Malaysian to be more environment efficient customers.

7. Recommendation for future research

The preference of the research respondents, the green movements and green interest may differ between generations, hence, it is suggested to replicate in other green products for example ,personal health care products or fast-moving-goods (FMCG) which might influenced by health conscious people. Thus, the characteristic of the sample may show vary results because people’s behavior influenced by other background factor for instance, age, culture, personality, emotion, values, general attitudes and experience. Furthermore, it is recommended to have other variable or mediator that could significantly ‘move’ the customers to engage in buying green.

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## OFP-003

## The Impact of Information and Communication Technologies on Company Performance: An Application on Manufacturing and Construction Sectors

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### Abstract

This study aims to investigate the impact of information and communication technologies on company performance. In this context, the data is obtained from a survey which is conducted to companies that are operating in manufacturing and construction sector. This questionnaire was administered to 190 companies in the October-December 2014. By using the data, it is tried to investigate ICT usage level, the impact of ICT on the productivity of companies, competitiveness and innovation process, and also the government's ICT policy and regulation with the perspectives of companies. In the study, the rate of the companies which stated that the output of per employee is increased in the last three years is 33.7%. The rate of those who explain the rise of output for per worker by usage of ICT is 11.9% and the rate of those explain the rise by the usage of ICT and other factors is 31.3%. The rate of those explaining the decrease in operational costs by the usage of ICT is 4.4% and the rate of those explaining the decrease by both the usage of ICT and other factors is 93.3%. The rate of companies stating that the price competition is very important in the increase of market share when compared to past three years is 55.3%. It is determined that the rate of those who state that the importance of the price competition in the increase of market share is mostly due to the usage of ICT, is 10.9% and 30.9% is the rate of those who believe that this importance is due to both the usage of ICT and other factors. As a result it is determined that using ICT positively effects the productivity, competitiveness and innovation process of companies.

### 1. Introduction

The increasing competition emerging with globalization leads both economic and social organizations to have different strategies. Today, the most important strategy used by all business organizations can be expressed as information and communication technologies (ICT). Knowledge-based economy and the use of ICT are among the important factors that increase the efficiency and effectiveness of the firms. Therefore, the use of ICT and knowledge-based economy can be considered as a strategic factor for business productivity. The improvement of competition in macro level and skills in micro level of a country strongly depends on increased investments of ICT in all sectors (Hagemann, 2008). Therefore, the level of use of ICT can be considered among the most important determinants of a country's wealth. ICT is a factor used by companies to reach their costumers, stakeholders and suppliers and reduce their costs and save time in order to ensure the competitive advantage both in macro and micro level. The relationship between companies and suppliers has gained a new dimension by the use of ICT. Large firms began to make direct business with customers through new delivery systems such as the Internet with the effect of the use of ICT (Naudé & Holland, 1996). In this way, they increase the amount of sales and productivity by reaching more customers. An advanced ICT capacity leads the company to achieve a competitive position by improving the quality management (Jenkins, 2010). In addition, information management mediates ICT competence and firm performance (Tanrıverdi, 2005; Lo'pez and Algre, 2012). Companies are able to improve their ability to compete and become successful as long as they increase the use of ICT in their bodies. This success can be achieved by giving importance to both company-wide and country-wide ICT investments. In Turkey, ICT investments have shown rapid increase in general over the last decade (Ministry of Development, 2014). While the total amount of investments conducted in 2002 was approximately 614 million Turkish Liras, it has exceeded 3 billion 684 million Turkish Liras in 2014, which is 5 times more than the amount of investments made 12 years ago. Many studies conducted on impact of ICT on organization by academicians along with the use of ICT in organizations. In the studies conducted, the impact of ICT on many different sectors such as construction (Duyshart et al., 2003), banking (Mistry, 2006), manufacturing (Beheshti 2004), education (Teo et al., 2012), staff productivity and human resources (Tohidi, 2010), accommodation (Fuchs et al., 2010; Law et al., 2014) and marketing (Loane et al., 2006) has been investigated; because ICT is an important technological process used in all areas. In the literature, the impacts of opportunities offered by ICT on the performance of firms are still discussed. In Turkey, the number of studies regarding impact of the use of ICT on companies is very limited. In this regard, it seems important to investigate this subject on a company level. Therefore, in this study, it has been aimed to investigate the impact of the use of information and communication technologies on the companies operating in the construction and manufacturing sectors.

### 2. Literature Review and Hypotheses

ICT is expressed as a comprehensive concept including the production, processing, access and distribution of information (Allameh et al., 2012). Information technologies are a common term used for a variety of technologies such as computers, telecommunications and microelectronics in general and also including information transmission and processing (Nyamboga and Kemparaju, 2002). In the literature, there are conflicting results regarding the impact of ICT use on firm performance (Devaraj and Kohli, 2003; Lee et al., 2008). According to empirical studies conducted over the last decade regarding this subject, the performances of companies improved in an indirect way by improving capabilities in the organizational structures with the use of ICT (Rai et al., 2006; Pavlou and El Sawy, 2006; Benitez-Amado et al., 2010). Considering the studies conducted regarding the relationship between the use of ICT and firm performance in the literature, it has been concluded that the use of ICT has increased the company performance in the competitive environments (Bhatt and Grover, 2005; Patrakosol and Lee, 2009; Benitez-Amado et al., 2010; Marti'n-Rojas et al., 2011; López and Alegre, 2012). In addition, according to the empirical studies, it has been stated that the use of ICT improves the quality of the performance (Perez-Arostegui et al., 2012), improves the performance of the marketing functions (Noh ve Fitzsimmons 1999), increases the efficiency of the purchasing process of suppliers (Baglieri et al., 2007) and improves the performance management (Kagaari et al., 2010).

In the study of Johannessen et al. (1999), in which the impact of ICT use on innovation and performance was investigated, it has been concluded

that the use of ICT improves innovation and performance. In another study conducted by Lo'pez and Alrgre (2012) to investigate the relationship between ICT competence and information processes and company performance, they have stated that ICT competence plays an important role in the information management processes, these management processes are directly related to the company performance which is also related to the financial performance, there is an indirect relationship between company performance and information management and information management processes mediate ICT competence and market performance. Small and Medium Sized Enterprises (SMEs) play an important role in the economy by creating job opportunities, affecting the income level of people in micro-level and enabling local resources to be used effectively. In the academic studies conducted, it is stated that the use of ICT has positive impacts on SMEs. In this context, Ongori and Migiro (2010) state that adopting and internalization of ICT by SMEs are important in increasing their competitiveness and the use of ICT also increased their availability to international markets. Beheshti (2004) studied the impact of ICT on SMEs and stated that the use of ICT has positive impacts on SMEs operating in manufacturing and service sectors.

ICT investments made by companies have positive impacts on their performances. According to a study conducted by Chondrakis and Farchi (2014), it has been found that the number of successful patent applications increases significantly in companies that have technological investment initiatives. In the study of Bilgihan et al. (2011), in which the impact of ICT on competitive advantages of hotels was investigated, it has been determined that ICT investments lead to lower costs in general, agility, innovation, added value and better customer service for the customers. Similarly, Ayeh (2006) has found that the use of Internet is the main driver for organizational features in the hotel industry. However, in another study investigated whether the use of ICT has any impact on the productivity of hotel industry, it has been found that despite increasing investments in ICT, it is difficult to express the impact of ICT on productivity (Sigala, 2003).

According to studies investigating the impact of the use of ICT on the company performance in the construction sector, it has been stated that ICT has positive impacts. In addition, it has been also stated that the use of ICT has positive impact on operational efficiency and effectiveness (Betts et al., 1991; Walker, 2000; Betts and Clark, 1999; Betts and Ofori, 1999). Duyshart et al. (2003) have conducted a study in order to investigate the effect of ICT on a construction project and stated that the use of ICT has positive impacts both on efficiency and effectiveness of the construction project. As a result of another study conducted by Peansupap and Walker (2006), in which the limitations of ICT use in construction sector was investigated, they have stated that a limited budget for ICT investments, dependency on the participants of other projects, ICT standardization problems and security issues are the personal limitations; whereas the basic level of computer experience, time available to learn ICT tools and determination of the benefit of ICT use are the organizational limitations and time available, information sharing and personal communication quality are the limitations at the level of groups, respectively. In a study, in which the impact of ICT use on the steel industry was investigated, data was collected by a questionnaire applied on managers and personnel from different areas. As a result of the study, the use of ICT has been found to be increasing the working efficiency of workers. Cragg et al. (2002) have indicated that the use of ICT has positive impacts on the performance of companies operating in the manufacturing sector. Lia et al. (2006) have investigated the ICT use of companies in China and determined that the use of ICT significantly affected the competitive advantage of companies operating in the logistics sector. Razali et al. (2014) have determined a little impact of the use of ICT on companies operating in the retail sector in Malaysia and they have stated that these companies continue their activities with traditional methods. World Bank (2007) has conducted a study in order to demonstrate the relationship between the use of ICT and innovation and economic growth in Russia, Poland and other Baltic countries. As a result of the study, it has been determined that the use of ICT improves the economic performance and facilitates the modernization of the companies in addition to having positive impacts on facilitating advanced production, organizational change and improved marketing.

### 3. Methodology

#### 3.1. Research Goal

This study was conducted to determine the impact of ICT use on company performance. For this purpose, a field research was conducted using the survey method.

#### 3.2. Sample and Data Collection

In the study, the data was collected by a questionnaire administrated on a total of 190 companies operating in the manufacturing and construction sectors in the city center of Bingol. The survey developed by World Bank (2007) was adapted to the sample of the study. This survey was conducted between October and December of 2014. The questionnaire administrated consists of questions aiming to determine ICT usage level, the impact of ICT on the productivity of companies, competitiveness and innovation process, and also the government's ICT policy and regulations within the perspectives of companies. The raw data obtained from interviews conducted with the population of the study was controlled by SPSS software in terms of various aspects and the errors detected were corrected. Then, the impact of the use of ICT on the company performance and the views of relevant companies were presented with the help of percentage and cross tables.

#### 3.3. Measurement of Firms Performance

In the study, company performance was tried to be measured with four indicators (World Bank, 2007). Each indicator has two subscales. In this context, the company performance was tried to be presented by using four concepts; productivity (output and operational cost per staff), growth (revenue derived from sales and profits), innovation (capital allocated for innovation and ICT) and competitiveness (quality competition and price competition). The impact of the use of ICT only, the impact of the use of ICT and other factors together and the impact of other factors only were evaluated in accordance with opinions of the owners of the companies. Other factors were considered to be organizational change, equipment investment, changes in the structure of wages, staff training and new marketing strategies.

### 4. Key Findings

#### 4.1. Sample Properties

Descriptive statistics of the companies included in the study are given in Table 1. Accordingly, 6 people are working in these companies in average. In 2013, the average value of purchased goods and services is determined to be 200000 TL (Table 1).

Table 1. Descriptive statistics of the sample

The Variables	Average	Standard Deviation	Median	Smallest	Largest
The number of employees who worked in the company in 2013	21.44	47.86	6	0	310
The total turnover of the company in 2013	1118372	2473250	300000	0	18750000
The value of purchased goods and services in 2013	689944	1492839	200000	0	16000000
Observation	199	199	199	199	199

The rate of companies included in the study using computers in the last three years is 78.4%, while the rate of Internet users is 75.9% and the rate of companies that have a website is found to be 40.2%, respectively. Although the use of computer and internet is very common in companies, the rate of having a website is low. Majority of the sample (63.3%) uses an electronic mail. The rate of intranet users is 20.1%, while 26.1% of them use local area network and 19.1% of them use wide area network, respectively. 47.7% of the companies are connected to the internet with an analog modem, while 34.7% of them are connected via DSL.

• *The use of ICT and labor productivity*

The ratio of those stating that there is no change in the output per employee is 48.7%, while the ratio of those stating that their outputs are increased is 33.7% and 17.6% of them stated that there is a decrease, respectively. According to these results, the ratio of those stating that their outputs are increase is higher than those stating that their outputs are decreased. The distribution of the changes in the output of the employees in accordance with ICT and other factors in the last three years is given in Table 2. According to Table 6, the ratio of those stating that the changes in the output of the employees are mostly caused by the use of ICT only is 11.9%, while 31.3% of them stated that these changes are caused by the use of ICT and other factors together and 56.7% stated that they are caused by other factors only, respectively. These results show that the use of ICT has positive impacts on labor productivity when used with other factors together. Other factors were found to be staff training (16.5%) and new marketing strategies (12.5%), respectively.

Table 2. Distribution of the changes in the output of the employees in accordance with ICT and other factors in the last three years

The changes in output per employee		The reason of the changes in output per employee			Total
		Mostly the use of ICT	The use of ICT and other factors	Mostly other factors	
High	Number	8	21	38	67
	%	11.9	31.3	56.7	100.0
Low	Number	1	9	25	35
	%	2.9	25.7	71.4	100.0
Total	Number	9	30	63	102
	%	8.8	29.4	61.8	100.0

• *The use of ICT and operational costs*

When companies included in the study compared with their last three years, it has been stated that the operational cost per output of 42.7% of the companies didn't change, while the operational cost of 34.7% of the companies increased and the operational cost of 22.6% of the companies reduced, respectively. According to these results, a few companies stated that their costs were dropped down. The distribution of changes in operation costs per output based on the use of ICT and other factors in the last three years is given in Table 3. Accordingly, the ratio of those stating that reduction in the operational costs is caused mostly by the use of ICT is 4.4%, while the ratio of those stating that other reasons caused this change is 93.3% and finally 2.2% of the companies state that the reason of reduction in the operational costs are both the use of ICT and other factors, respectively. The use of ICT and other factors have a little impact on the reduction of operational costs per output. More extensive use of ICT in companies can cut the costs over time; because, the use of ICT reduces the processing time and improve the quality of operations. The other factors reducing the operational costs per output were determined as changes in the structure of wages (40.2%), new marketing strategies (23.6%), organizational change (18.1%), staff training (16.6%) and equipment capital investment (13.1%), respectively (Table 3).

Table 3. Distribution of operational cost changes per output based on the use of ICT and other factors in the last three years

The mean operational costs		The reason of changed in the operational costs per output			Total
		Mostly the use of ICT	The use of ICT and other factors	Mostly other factors	
High	Number	22	18	29	69
	%	31.9	26.1	42.0	100.0
Low	Number	2	1	42	45
	%	4.4	2.2	93.3	100.0
Total	Number	24	19	71	114
	%	21.1	16.7	62.3	100.0

• *The use of ICT and revenues*

34.7% of the companies included in the study stated that their sales revenues have increased in the last three years. On the other hand, 46.2% of these companies stated that their sales revenues remained same in the last three years and 19.1% of them stated that their revenues dropped down, respectively. The distribution of sales revenues of the companies depending on the use of ICT and other factors for the last three years is given in Table 4. Accordingly, the ratio of those stating that the changes in sales revenues are caused by mostly the use of ICT is 5.8%, while the ratio of those stating both the use of ICT and other factors is 24.6% and the ratio of those stating that the reason is other factor only is found as 69.63%, respectively. It has been seen that



the use of ICT and other factors have impact on the sales revenues. The effect of ICT and other factors on the reduction of sales revenues is very little.

Table 4. Total amount of changes in sales revenues of the companies depending on the use of ICT and other factors in the last three years

The changes of sales revenue		The reasons for change of sales revenues			Total
		Mostly the use of ICT	The use of ICT and other factors	Mostly other factors	
High	Number	4	17	48	69
	%	5.8	24.6	69.6	100.0
Low	Number	1	1	36	38
	%	2.6	2.6	94.7	100.0
Total	Number	5	18	84	107
	%	4.7	16.8	78.5	100.0

• *The use of ICT and profitability*

The ratio of those stating that their sales profit increased in the last three years is 43.7%, while 30.7% stated that their sales profit didn't change and 25.6% of the companies stated that their sales profit dropped down in the last three years, respectively. According to these results, the ratio of those stating that their sales profit increased in the last three years is quite high. Distribution of changes in the sales profit of the companies in the last three years depending on the use of ICT and other factors is given in Table 5. According to Table 5, the ratio of those stating that the increase in sales profit is mostly led by the use of ICT is 27.6%, while 26.4% of these companies stated that the increase in the sales profit is led by the use of ICT and other factors together and the ratio of those stating other factors is determined as 46%, respectively. These results show that the use of ICT is an important factor in the increase of sales profit of the companies. In addition, considering the impact of the use of ICT and other factors together on the sales profit of the companies, it is more obvious that the impact of the use of ICT on the sales profit of the companies included in the study is higher.

Table 5. Change in the sales profit of the companies depending on the use of ICT and other factors in the last three years

The changes in the sales profit		The reason for the changes in the sales profit			Total
		Mostly the use of ICT	The use of ICT and other factors	Mostly other factors	
High	Number	24	23	40	87
	%	27.6	26.4	46.0	100.0
Low	Number	5	4	52	61
	%	8.2	6.6	85.2	100.0
Total	Number	29	27	92	148
	%	19.6	18.2	62.	100.0

• *The use of ICT and innovation capital investment*

20.6% of the companies stated that their innovation capital investment increased compared to the last three years. In addition, 58.2% of them stated that their capitals allocated for innovation investments remained same and 21.1% of them stated that it was reduced in the last three years. The distribution of change of innovation capital investment of the companies in the last three years depending on the use of ICT and other factors are given in Table 6. The ratio of those stating that the increase in innovation investments mostly led by the use of ICT is 17.1%, while 24.4% of the companies stated that the reason of this increase is both the use of ICT and other factors and 58.5% stated other factors as the reason of this increase in their innovation investments in the last three years, respectively. According to these results, it has been determined that the use of ICT and other factors have impacts on the increase of the capital allocated for innovation investments of the companies. In addition, surprisingly, the effect of the use of ICT is found to be at minimum level on the reduction of capital for innovation investments.

Table 6. The change in the capital allocated for innovation investments of the companies in the last three years

The innovation capital investment		The reason of change in the innovation capital investment			Total
		Mostly the use of ICT	The use of ICT and other factors	Mostly other factors	
High	Number	7	10	24	41
	%	17.1	24.4	58.5	100.0
Low	Number	0	3	38	41
	%	0.0	7.3	92.7	100.0
Total	Number	7	13	62	82
	%	8.5	15.9	75.6	100.0

• *The use of ICT and ICT investment capital*

11.5% of the companies included in the study stated that their capitals allocated for innovation investments are increased in the last three years. In addition, 15.6% of the companies stated that their investments on ICT is reduced in the last three years, while 73.4% stated that it remained same, respectively. Only a few companies stated that their capital allocated for ICT investments were increased. The ratio of those stating that the increase in the ICT capital investment is led by only the use of ICT is 4.3%, while 52.2% of the companies consider both the use of ICT and other factors as the reason of this increase and 43.5% of them stated that mostly other factors are the reason of the increase in the ICT investments, respectively. It is clear that the use of ICT and other factors are effective on the increase of capital allocated for ICT investments. However, although the ratio of those stating that there is an increase in the capital allocated for ICT investments is very low, the effect of other factors were determined to be quite high (Table 7).

Table 7. The change in the capital of the companies allocated for ICT investments in the last three years

The capital investment of ICT		The reason why capital allocated for ICT investments is changed			Total
		Mostly the use of ICT	The use of ICT and other factors	Mostly other factors	
High	Number	1	12	10	23
	%	4.3	52.2	43.5	100.0
Low	Number	1	4	25	30
	%	3.3	13.3	83.3	100.0
Total	Number	2	16	35	53
	%	3.8	30.2	66.0	100.0

• *The use of ICT and price competition*

55.3% of the companies stated that the price competition is very important for increasing the market share in the last three years, while 18.1% stated that the importance of price competition is little for increasing the market share in the last three years, respectively. These results show that more than half of the companies consider the price competition very important for increasing the market share. The ratio of those stating that the reason why price competition is very important to increase the market share is the impact of mostly ICT use is 10.9%, while this ratio is 30.9% for both the use of ICT and other factors together and 58.2% for those who consider the effect of other factors as the main reason of this importance, respectively. One of the factors contributing to the increase of market share with price competition is considered to be the use of ICT (Table 8).

Table 8. The distribution of importance of price competition for the increase in market share in the last three years depending on the use of ICT and other factors

The importance of price competition to increase the market share		The reason why price competition is important for increasing the market share			Total
		Mostly the use of ICT	The use of ICT and other factors	Mostly other factors	
Very Important	Number	12	34	64	110
	%	10.9	30.9	58.2	100.0
Less Important	Number	3	9	24	36
	%	8.3	25.0	66.7	100.0
Total	Number	15	43	88	146
	%	10.3	29.5	60.3	100.0

• *The use of ICT and quality competition*

75.9% of the companies included in the study stated that quality competition is very important for increasing the market share in the last three years, while 11.1% of them consider the quality competition not very important for increasing the market share in the last three years, respectively. This finding shows that a large portion of the companies consider that quality competition is very important for increasing the market share. In addition, according to these results, quality competition seems more important than price competition for companies to increase their market share. The distribution of importance of quality competition for gaining the market share in the last three years depending on the use of ICT and other factors is given in Table 9. The ratio of those stating that the importance of quality competition is resulted by mostly the use of ICT is 6%, while this ratio is 26.5% by the use of ICT and other factor together and 67.5% by mostly the other factors only, respectively. The impact of ICT on the less significance of quality competition is found to be minimal. These results show that the impact of ICT use to increase the market share by quality competition is limited and this increase is mostly depending on other factors.

Table 9. Distribution of the importance of quality competition on the increase of market share in the last three years depending on ICT and other factors

The importance of competition in quality		The reason why competition in quality is important			Total
		Mostly the use of ICT	The use of ICT and other factors	Mostly other factors	
Very important	Number	9	40	102	151
	%	6.0	26.5	67.5	100.0
Less important	Number	0	5	17	22
	%	0.0	22.7	77.3	100.0
Total	Number	9	45	119	173
	%	5.2	26.0	68.8	100.0

## 5. Conclusion

In this study, it has been aimed to investigate the impact of the use of ICT, which has become an increasingly important factor for all organizations, on the performance of companies operating in the manufacturing and construction sectors. The rate of companies included in the study using computers in the last three years is 78.4%, while the rate of Internet users is 75.9% and the rate of companies that have a website is found to be 40.2%, respectively. These results indicate that computers and internet, which have become a necessity to use in a company, are not used by some of the companies included in the study. In addition, it has been also found that more than half of the manufacturing and construction companies don't have a website. Website is an

important ICT tool to facilitate the company's visibility and marketing activities; because, it has been known that the first source used by consumers to find a product is the internet. Costs per output are considered as another indicator showing the productivity of the companies. 22.6% of the companies stated that their operational costs per output have reduced. The majority of the companies stated that the reduction in operational costs is caused by other factors. Operational costs of the companies can be reduced with extensive use of ICT over time. Because the use of ICT reduces the time spent for operations and improves the quality. The growth of a company depends on its revenues gained from sales and sales profit. According to the results of the study, the ratio of those stating that their revenues obtained from sales has increased in the last three years is 34.7%, while 43.7% of them stated that their sales profit increased, respectively. 5.8% of the companies think that the increase in the revenues is led by the use of ICT only and 24.6% of them think that other factors lead to such an increase, respectively. It has been seen that the use of ICT and other factors have an impact on the sales revenues together. In addition, the impact of ICT use and other factors with the use of ICT on the sales revenues is found to be quite high. In the study, it is also determined that the use of ICT has an important impact on the sales revenues. Because the ratio of companies stating that the use of ICT is the main reason of increased sales profit is 27.6%, while this ratio was determined as 26.4% for the use of ICT and other factors together. These results indicate that the use of ICT is an important factor increasing the sales profit. In addition, considering the impact of the use of ICT and the use of other factors with ICT on the increase of sales profit, the impact of ICT on the sales profit of the companies included in the study becomes more obvious. These results are consistent with the results of another study conducted by World Bank (2007). In the study, the use of ICT and other factors are effective in the increase of capital allocated for innovation investments and capital allocated for ICT investments together. The ratio of those stating that the increase in innovation investments mostly led by the use of ICT is 17.1%, while 24.4% of the companies stated that the reason of this increase is both the use of ICT and other factors, respectively. According to these results, it has been determined that the use of ICT and other factors have impacts on the increase of the capital allocated for innovation investments of the companies. In addition, surprisingly, the effect of the use of ICT is found to be at minimum level on the reduction of capital for innovation investments. The ratio of those stating that the increase in the ICT capital investment is led by only the use of ICT is found to be 4.3%, while 52.2% of the companies consider both the use of ICT and other factors as the reason of this increase, respectively. It is clear that the use of ICT and other factors are effective on the increase of capital allocated for ICT investments. According to other studies conducted, the use of ICT has positive impacts on the increase of investments done by the companies (World Bank 2007, Chondrakis and Farchi, 2014).

In the study, the impact of ICT use on the competitiveness of the company was considered within the context of price and quality competition. 55.3% of the companies stated that the price competition is very important for increasing the market share in the last three years. These results show that more than half of the companies consider the price competition very important for increasing the market share. The use of ICT is considered to be one of the important factors contributing to the increase of market share by price competition. Because the ratio of those stating that the reason why price competition is very important to increase the market share is the impact of mostly ICT use is found to be 10.9%, while this ratio is 30.9% for both the use of ICT and other factors, respectively. The majority of companies (75.9%) consider the quality competition as an important factor to gain the market share. According to these results, quality competition seems more important than price competition for companies to increase their market share. In the study, the ratio of those stating that the importance of quality competition is resulted by mostly the use of ICT is 6%, while this ratio is 26.5% by the use of ICT and other factor together. In addition, the impact of ICT on the less significance of quality competition is found to be minimal. The results of the study of Perez-Arostegui et al. (2012) are consistent with our results. The contribution of the use of ICT to increase the market share becomes higher when it is used with other factors. As a result, it has been determined that the use of ICT with other factors has positive impacts on the performance of the companies included within the sample of the study. The impact of ICT use on the company performance is limited. However, the use of ICT becomes more effective when used with other factors together. Companies should select their ICT processes by considering their own properties. Governments can establish strategies to promote the use of ICT and organize ICT training programs for free of charge. This study reveals the impact of ICT use on the company performance at micro level. In future studies, better results can be achieved by conducting them on a national scale with a broad perspective.

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OFF-004

## Personality and Gender as Predictors of Entrepreneurial Cognitive Adaptability

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### Abstract

Cognitive adaptability, defined as ability to quickly make sense of the changing business environment and act accordingly, is an emerging realm of entrepreneurial research. The aim of the present study was to develop and validate a relationship between cognitive adaptability (CA) of entrepreneurs and Big Five Personality traits. The role of gender difference in this relationship was also investigated. By using theories of personality development, social learning, situated cognition, and meta-cognition a logical relationship between personality traits and entrepreneurs' cognitive adaptability was established. Quantitative strategy and cross-sectional survey method was deployed to collect data. Randomly selected 443 entrepreneurs responded to this survey. Factor analyzed structural equation modelling (SEM) demonstrated good model fit and estimated cognitive adaptability as a second order factor, having a significant impact of extroversion and neuroticism on cognitive adaptability. Multi-group moderation revealed a significant difference among females and males.

### 1. Introduction

Entrepreneurship entails identification and exploitation of opportunities (Scott & Venkataraman, 2000); in the wake of uncertainties, complexities, and dynamism of the environmental factors (Knight, 2012; McGrath, 1999; Zahra, Neubaum, & Hagarassey, 2002). To identify and exploit opportunities, under such dynamic conditions, entrepreneurs require a mindset, endowed with the ability to quickly make sense of the environmental changes and act accordingly (Ireland, Hitt, & Sirmon, 2003). Haynie (2005) proposed that this 'entrepreneurial mindset' is analogous to Cognitive Adaptability, which stems out of five metacognitive dimensions namely: "goal orientation, metacognitive knowledge, metacognitive experience, metacognitive control, and monitoring". The author proposed that high aggregate score on these dimensions constitutes entrepreneur's ability to identify and make use of those unforeseen opportunities which others remain unable to find. Putting it simple, entrepreneurial mindset is an outcome of the cognitive adaptability skill, and entrepreneurial activity necessitates a high level of cognitive adaptability among entrepreneurs (Haynie, 2005; McGrath & Mac Millan, 2000). The underpinnings of cognitive adaptability are consistent with sense-making perspective – which argues that cognitive processes to make sense of the environment, and capability to do so, varies among individuals; and consequently some individuals are intrinsically better than others in performing under uncertain situations (Weick, Sutcliffe, & Obstfeld, 2005). It also dovetails with contemporary cognition perspective of entrepreneurial research – which posits that entrepreneurs demonstrate a different thinking pattern than non-entrepreneurs (Baron, 2000); give unique interpretation to the environmental phenomenon and as a result ascertain those unforeseen opportunities which others usually remain unable to mark (Shepherd & Douglas, 1999). Though importance of cognitive flexibility, in identification and capturing entrepreneurial opportunities, has long been a thriving branch of entrepreneurial and cognition research, its current manifestation into *cognitive adaptability (CA)* – as aggregate of five metacognitive dimensions – is indeed an emerging concept in entrepreneurship literature. The present paper further explores this vital entrepreneurial ability, by identifying its relationship with traits that can predict its propensity among different individuals. Accordingly, it undertakes an empirical investigation of the relationship of cognitive adaptability with personality and gender difference by taking CA as dependent, and personality and gender as independent variables. Personality has been selected as an independent variable because cognition plays central role in development of personality (Cattell & Tregaskis, 1965) and hence can predict propensity of cognitive adaptability. Whereas gender has been selected for the reason that male and female entrepreneurs differ in terms of their cognition (Chaganti & Parasuraman, 1996; Fischer, Reuber, & Dyke, 1993; Verheul, 2003), and therefore may also diverge in terms of their cognitive adaptability. Studying gender and personality as predictor of cognitive adaptability contributes towards both – the body of knowledge and world of practice. Insofar theoretical relevance is concerned; it expands our understanding of cognitive adaptability as well as personality. While on the practical front, knowing which gender and personality type is less cognitively adaptive to the changing environmental conditions indicates that their entrepreneurial training and/or education should have enhanced focused on inculcating this critical ability.

### 2. Literature Review And Hypotheses

Literature view section has been divided into further three sub sections. In first section, theoretical roots and emergence of the concept of cognitive adaptability have been discussed. Section two includes overview of personality and expected relationship between personality types and CA. Finally the third section reviews literature to delineate relationship of gender and cognitive adaptability.

#### 2.1. Cognitive Adaptability

Neisser (1967) defined cognition as "all processes by which sensory input is transformed, reduced, elaborated, stored, recovered and used". Entrepreneurship research suggests that entrepreneurs tend to demonstrate a different cognitive patterns than others (Baron, 2000). They give unique interpretation to the environmental phenomenon and consequently ascertain those unforeseen opportunities which others usually remain unable to mark (Shepherd & Douglas, 1999). Cognitive approach to entrepreneurship argues that this distinction in thinking style is essentially because of the reason that entrepreneurs are different in acquiring, processing (Baron & Markman, 1999; Kruger & Evans, 2004) and structuring knowledge (Bouckenoghe, Broeck, Cools, & Vanderheyden, 2005) which is required for making decisions and working out opportunities. Entrepreneurs acquire knowledge in the form of information derived through task and general environment, knowhow and skills (Grant & Baden-Fuller, 1995) and then process and structure it in a peculiar way which enables them to delineate an ingenious orientation towards at hand opportunities and challenges. From construal of information to perception of opportunity and generation of options for resource acquisitions, cognition remains central to the entrepreneurial process (Shane & Venkataraman, 2000) and therefore, understanding entrepreneurial cognition becomes essential to explore the essence of entrepreneurship (Krueger,

2005). Cognitive approach towards entrepreneurship also appreciates the fact that entrepreneurs are often required to deal with highly complex and uncertain situations which require flexibility and adaptability to environmental conditions. This is particularly true in present business era – marked with unprecedented change and chaos (Ali, Bajwa, & Shahzad, 2011) – where ability to quickly get acquainted of situation, and subsequently take adequate decisions has become a requisite for entrepreneurs to move forward with business opportunities (Busenitz & Barney, 1997). While cognitive skills bestow entrepreneurs the advantage of being more creative and opportunity seeker, cognitive adaptability helps them to be dynamic and adjustable to the changing conditions of the given situation. Conceptualization of entrepreneurial cognitive adaptability owes much to James Haynie's (2005) effort of contextualization the idea of *entrepreneurial mindset*, proposed by Ireland, Hit and Simron (2003). The author posited that cognitive adaptability is an aggregate of five metacognition dimensions namely, “*goal orientation, metacognitive knowledge, metacognitive experience, metacognitive control, and monitoring*”. Metacognition, here, is referred to individual's ability to be aware of and control his learning patterns (Schraw & Sperling Dennison, 1994) which makes him more adaptive in dynamic and uncertain context (Earley & Ang, 2003).

## 2.2. Personality and Cognitive Adaptability

Personality has been described as “*combination of cognitive and behavioral patterns that remain stable over time*” and under different situations (Cattell & Tregaskis, 1965). This description suggests that cognitive pattern, and hence cognition, is one of the two major constituents of personality. Furthermore, research on behavior postulates that human behavior is derived by attitude, which is further classified into cognitive, affective, and behavioral components (Ajzen & Fishbein, 1977). Thus, cognition plays central role in development of personality and therefore it can be construed that cognition serves a common element between personality and cognitive adaptability, as both of these facets tend to emerge out of the cognitive processes of human mind. Since human being exhibit a large number of consistent behavioral patterns, researchers have been attempting to reduce or group similar patterns under the umbrella of certain broad attributes to describe personality in a concrete, measurable and understandable manner. In recent years, the Big Five Model (Norman, 1963) gained enormous popularity among researches as well as practitioners to determine personality of individuals (Hurtz & Donovan, 2000; Judge & Ilies, 2002). The model abridges human personality into “*Extraversion, Agreeableness, Conscientiousness, Emotional stability/Neuroticism, and Openness*” dimensions. A sufficient amount of literature on personality validate that dimensions of Big Five Model are adequately comprehensive to underline all other traits and encompasses most of the significant variations in human personality (Digman, 1990; Dyce & O'Connor, 1998; McCrae & Costa Jr, 1999).

### 2.2.1 Extraversion and Cognitively adaptive individuals

Extraversion – defined as being talkative, sociable and talkative – is one of the Big Five personality dimensions which relates to the ability of an individual to win cooperation from others. Literature puts forward that both extroverts and introverts may have high cognitive adaptability. Extroverts are good in evaluating themselves and their environment and discussing their views with others (Blaz, 1983) and therefore can score high on cognitive adaptability; whereas introverts spend more energy on examining things, and more concentrate on their inner world and (Wayne, Musisca, & Fleeson, 2004); hence it also seems reasonable to assume that they will also have high cognitive adaptability.

### 2.2.2. Agreeableness and Cognitively adaptive individuals

Agreeableness is a Big Five dimension, which according to researchers is closely related to extraversion (Graziano & Tobin, 2009). The dimension demonstrates tendency of a person to maintain strong and positive relations with others. Positive and close relationships with others are important to everyone in general and entrepreneurs in particular, because these relationships are considered one of the biggest resources for an entrepreneur. While entrepreneurs are postulated as persistent fellows who tend to be strict with their views and be assertive to impose them (a trait associated with extraversion), it seems reasonable to hypothesize that high incidence of agreeableness could enable them to rethink their strategies to attain cooperation from others for achieving their goals. Putting it simply, it can be postulated that individuals with high score on agreeableness dimension would also have high cognitive adaptability.

### 2.2.3. Conscientiousness and Cognitively adaptive individuals

Conscientiousness is referred to the extent to which an individual has more self-control and is ambitious for success (Costa, McCrae, & Dye, 1991). Since self-control is described one's control of his or her mind, clearly this definition suggested that a high correlation between conscientiousness and cognitive adaptability could exist. The premise is further strengthened with the finding that individuals with high conscientiousness think more before their actions as compare to low conscientious people who are usually carefree of consequences (McCrae & Costa Jr, 1999). Griffin & Hesketh (2005) have, however, proposed that conscientiousness has negative correlation with performance in a change-task situation, which demonstrated less cognitive flexibility in conscientious individuals. Therefore, while overwhelming evidence suggests high probability of correlation between cognitive adaptability and conscientiousness, there are some evidenced that this there might be a negative relation between these two variables.

### 2.2.4 Openness to experience and Cognitively adaptive individuals

Openness to experience is a trait in Big Five taxonomy which emanates from motivational and cognitive components (McCrae & Costa Jr, 1997), where motivation refers to willingness of trying new happenings and cognition is refers to the ability of an individual to process information and learning (LePine, Colquitt, & Erez, 2000). Cognitive component of openness to experience entails adaptability to the changing environment through adaption and unlearning processes. It is in lined with finding of Rothstein & Goffin (2006) that cognitive ability is strongly related to the performance under complex and novel (un-usual) situations. Similarly, McCrae and Costa (1997) suggested that openness to experience is linked with the recurring need to not only enlarge experience but also examine them – another trait related to the cognitive adaptability. Literature on openness to experience accrue that high openness would have strong correlation with cognitive adaptability.

### 2.2.5. Neuroticism and Cognitively adaptive individuals

Neuroticism is a Big Five dimension which is flipside of the emotional stability. Since the promulgation of theory of emotional intelligence in Organization Behavior, an enormous amount of research has shown that emotional stability is positively associated with performance and satisfaction at workplace (Rothbart, Ahadi, & Evans, 2000). Literature on personality studies posits that Neuroticism is associated with anxiety, fearful and emotional instability (McCrae & Costa Jr, 1997). More importantly, Hogan (1986) reported that high score in neuroticism is correlated with less chance of adjustment. Understandably, a person having anxiety and emotional instability would find it difficult to adjust according to the rapidly changing situation. Literature on personality therefore suggests that high neuroticism will not bode well with cognitive adaptability.

## 2.3. Gender and Cognitive Adaptability

In studying the likely relation between personality and cognitive adaptability, the role of gender difference remains pertinent, because gender

influences the individual talent, management skills, leadership style (Burke & Collins, 2001) as well as likeliness of opportunities and constraints which individuals in general and entrepreneurs in particular encounter in their occupational paths (Bussey & Bandura, 1999). Male and female entrepreneurs differ in terms of their mental orientation – in other words cognition – in starting and running ventures, selection of products and market segment, as well as in formulation and pursuance of their goals (Chaganti & Parasuraman, 1996; Fischer, et al., 1993; Verheul, 2003). Given this relevance of gender in economic endeavors, entrepreneurship research takes due note of the impact of gender differences in likeliness and success or failures of entrepreneurial process (Zhang, et al., 2009). A number of studies has reported high incidence of entrepreneurship for men than that of women with similar backgrounds (Brush, 1992; Haber, Lamas, & Lichtenstein, 1987). Moreover, the propensity of becoming entrepreneur is reported twice in men than women (Reynolds, Gartner, Greene, Cox, & Carter, 2002) because of the observation that females are less risk takers (Powell & Ansic, 1997) and less active than males in entrepreneurial activities (Allen, Langowitz, & Minniti, 2007). Despite this well established reckon of gender differences in entrepreneurial activity (Gatewood, Carter, Brush, Greene, & Hart, 2003) it is interesting to note that study of those factors and cognitive process which might impinge on male and female entrepreneurship in their decision to pursue entrepreneurial endeavours is at bare minimum level (Verheul, 2005; Zhao, Seibert, & Hills, 2005). Same is true for entrepreneurial cogitation research in general and cognitive adaptability in particular. There is no study conducted as yet to find out the relationship of gender difference with cognitive adaptability skills of entrepreneurs.

### 3. Theoretical Framework & Hypotheses Development

As discussed in literature review part, personality and cognitive adaptability have two clear common grounds. First is *cognition*, which is central to both the development of personality and cognitive adaptability skills among individuals. Second is *environment*, which is a dominating factor for the development of personality as well as cognitive adaptability. *Theory of personality as social learning*, *theory of situated cognition*, and *theory of metacognition* provide a theoretical foundation to this study to establish a relationship between personality, gender, and cognitive adaptability. Theory of personality as social learning is mainly associated with the work of Bandura and Walters (1963). The theory builds upon the work of personality theorists like Skinner – who brought forward the notion of learning from environment as fundamental element of personality – and underlines that human beings are not mere passive objects of environment; rather they can think of and regulate their behavior. Furthermore, it suggests that personality development of an individual involves interaction with others; and therefore to study personality the social context in which behavior is acquired and maintained becomes pertinent. It is worth noting here that both of these phenomena, as underlined by Bandura, are related to two main cognition theories which has led to the emergence of the concept of cognitive adaptability, namely *situated cognition* and *metacognition*. The proposition of theory of social learning that human beings can think and regulate their behavior is consistent with the theory of metacognition – whereby metacognition is described as higher order thinking process which enables an individual to think about his thinking style and regulate his behavior. The second proposition of the theory of personality as social learning in which behavior is acquired and maintained in social context is in-line with theory of situated cognition – which emphasis that cognitive patrons of individuals are developed in preview of the social context of that individual. Like social learning theory of personality, theory of situated cognition suggests that the cogitative patterns of individuals are adaptive to the environmental actors (Taylor, Fraser, & Fisher, 1997). The human behavior, as per situated cognition theory, is guided by how he or she makes sense of the environment; and this sense making process is influenced by environment as well as individual's motivation. The propositions of situated cognition, especially the view that individuals have multiple cognitive strategies in a given task, provide fundamental theoretical inputs to the emergence of the concept of cognitive adaptability. Similarly, it gives a clear idea that in addition to cognitive processes, there is a higher level of cognition, occurring at an unconscious level, which enables an individual to generate multiple strategies to take inferences from and deal with the environment. Theory of metacognition, however, suggests that unlike the proposition of situated cognition theory – that higher level cognition process occurs at unconscious level – cognitive function are performed in a hierarchical system, where cognition is a lower order constituent which is mainly responsible of handling informational cues, and metacognition is a higher order process which organizes individual's knowledge about himself, tasks and environment around him. This higher order process, is fully conscious, and enables an individual to rethink his lower level cognition functions in a way which facilitates identifying multiple cognitive strategies for achieving the desired tasks. Theory of metacognition gives high consideration to the interaction of an individual's motives and environmental factors and postulates that cognitive flexibility will result in multiple metacognitive strategies that will produce multiple cognitive, behavioral, and emotional responses. Since personality is described as function of behavior and behavior has been suggested as outcome of emotional, cognitive and behavioral components of individual's attitude (Rothbart, et al., 2000), a relationship between personality and cognitive adaptability can be expected. Therefore, the following hypothesis is presented to be tested;

**H1:** *Personality traits, as described by Big Five, have a significant impact on cognitive adaptability of entrepreneurs.*

The question of gender difference in personality characteristics is neither new nor understudied phenomenon. Pioneers of gender studies assumed that the individual difference in personality owes much to the biological factors (Feingold, 1994). Subsequently, the focus got shifted towards social behavior and cognitive differences. Similarly gender has also been a focus of entrepreneurship literature as researches have shown a difference in probable likeliness of entrepreneurship ventures among males and females. In their study, (Surendra, Ruthie, & Safdar, 2001) concluded that chances of getting into entrepreneurial ventures are double among males as compare to their counterpart females. (Powell & Ansic, 1997) dovetailed this conception by arguing that females tend to be less risk takers in the business decisions and therefore do not fully exploit entrepreneurial opportunities. More importantly, literature has reported a difference among males and females in terms of their mental orientation of decisions about starting new business and key operations like segmentation, articulation of goals and strategies i.e. see (Fischer, Reuber, & Dyke, 1993). Since cognition is central component of personality dimensions, and there is ongoing debate about implication of difference between personality types of male versus females, it is logical to test the following hypothesis;

**H2:** *Impact of Personality traits, as described by Big Five, on cognitive adaptability significantly varies among male and female entrepreneurs.*

### 4. Methodology

This study used quantitative research strategy and survey method to collect data. People who had established and were running their own businesses were taken as the population of this study. Selection of entrepreneurs as study's population is aligned with the objective and questions of this research. Generally entrepreneurs are found in every type of organization i.e. manufacturing/services. In order to take holistic and broader information of the research variables participating respondents were taken from both manufacturing and services oriented organizations.

Probability sampling method was used to select respondents as the valid and authentic representative of the study's population. A list of active registered entrepreneurs was obtained from Small and Medium Enterprises Development Authority (SMEDA), Government Pakistan. Research

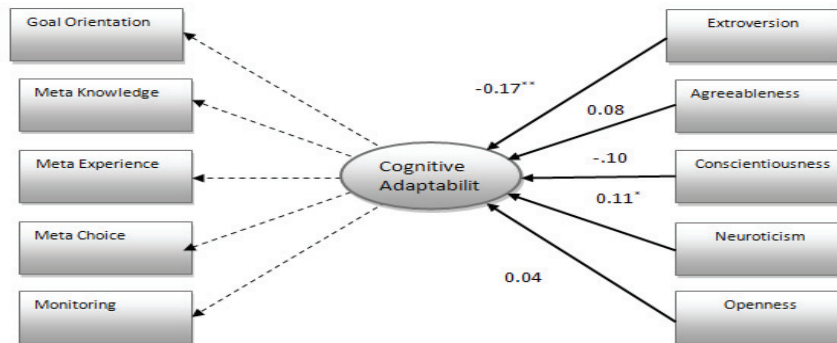
instrument used in this study contained 46 field questions; therefore 120 respondents (46\*3=138) were needed to produce valid and reliable findings. Self-administered questionnaire was used for collection of the data. The study adopted two instruments to gauge Big 5 personality traits and cognitive adaptability. Personality dimensions were measured by using the 10-item short version of the Big Five Inventory, developed by Rammstedt and John (2007). Cognitive adaptability was measured by using instrument developed by Haynie and Shepherd (2009). Instrument contained 30 questions, five questions for each dimension. Higher the score, more inclination of respondent was shown toward respective dimension. Validity and reliability of this instrument is well established.

**5. Results and Discussion**

In order to establish the validity of the proposed constructs for cognitive adaptability, confirmatory factor analysis was employed. Items with loadings below 0.5 were eliminated from the analysis. In all, 21 items out of 36 were retained in the analysis after the confirmatory factor analysis. The goodness of fit statistics, modification indices, standardized loadings, and standard errors were used to assess the model fit. The results showed that proposed constructs fit the data in a suitable manner. These findings indicated appropriate level of convergent and discriminant validity of the constructs. In order to estimate the reliability of the retained measurement items, Cronbach's alpha coefficient was again used. Reliability test was considered necessary to apply again due to elimination of some items from the original questionnaire. Alpha coefficients for all the constructs were above 0.77 indicating high levels of measure reliability. The standardized loadings, alpha coefficients, means, and standard deviations of the constructs are provided in table 3. Selected goodness of fit measures for the factor model are provided in table 3. In order to assess the relationship between cognitive adaptability and various personality types, structural equation modelling was employed. The structural model is shown in figure 1. The model estimated cognitive adaptability as a second order factor and estimated how various personality types impact the cognitive adaptability. Path estimates for the model are provided in table 2.

The results showed a significant impact of extroversion and neuroticism on cognitive adaptability. It was hypothesized earlier that all personality traits have a significant impact on cognitive adaptability of individuals. Since, two out of five personality traits have been found significantly related to cognitive adaptability, thus the first hypothesis is partially accepted. The goodness of fit statistics for the model has been provided in table 3. The discussion of the results is provided in the next section. In order to assess the impact of different personality traits on cognitive adaptability while incorporating the gender differences, structural equation modelling using multi-group moderation was employed. The structural model is already given in figure 1. The model estimated cognitive adaptability as a second order factor and estimated how various personality types impact the cognitive adaptability for males and females. Path estimates for the model are provided in table 4. The results showed that none of the personality type had a significant impact on the cognitive adaptability of females while a significant impact of extroversion and neuroticism on cognitive adaptability was found for the males. Since, the hypothesis posited that impact of personality traits on cognitive adaptability differs among males and females, in light of resultant findings, this hypothesis cannot be fully rejected. However, its pertinent to note that all males and females do not differ on all personality traits, instead difference is witnessed only among two personality traits namely extraversion and neuroticism. This difference will be discussed in due length in proceeding section of this thesis. The goodness of fit statistics for the model has been provided in table 5.

**Figure 2: Structural Equation Model**



**Figure 1: Structural Equation Model**



Table 1: Confirmatory Factor Analysis

Variable	Standardized Loadings	Cronbach's Alpha	Mean	Standard Deviation
<b>Goal Orientation</b>		0.82	3.59	1.51
I often define goals for my self	.695			
I understand how accomplishment of a task relates to my goals	.642			
I ask myself how well I have accomplished my goals, once I have finished	.720			
When performing a task, I frequently assess my progress against my objectives	.646			
<b>Metacognitive Knowledge</b>		0.88	3.45	1.54
I think of several ways to solve a problem and choose the best one	.706			
I perform best when I already have knowledge of the task	.761			
I think of several ways to solve a problem and choose the best one	.669			
I ask myself questions about the task before I begin	.720			
I try to break problems down into smaller components	.718			
I focus on the meaning and significance of the new information	.713			
<b>Metacognitive Choice</b>		0.77	3.45	1.47
I ask myself if I have considered all the options when solving a problem	.676			
I re-evaluate my assumptions when I get confuse	.755			
I ask myself if I have learned so much as I could have, when I finish the task	.765			
<b>Metacognitive Experience</b>		0.81	4.09	1.76
I think about what I really need to accomplish before I begin a task	.656			
I sue different strategies depending upon the situation	.704			
I organize my time to best accomplish my goals	.705			
I consciously focus my attention on important information	.857			
<b>Monitoring</b>		0.82	3.69	1.55
I stop and go back to information which is not clear	.701			
I am aware of what strategies I sue, when engaged in a given task	.748			
I find myself analyzing the usefulness of a strategy, while engaged in a task	.710			
I ask myself pausing to check my comprehension of given problem or situation	.701			

Table 2: Structural Model Path Coefficients

			Estimate	P
Cognitive Adaptability	<---	Agreeableness	.078	.264
Cognitive Adaptability	<---	Conscientiousness	-.095	.189
Cognitive Adaptability	<---	Neuroticism	.114	.094*
Cognitive Adaptability	<---	Extroversion	-.165	.016**
Cognitive Adaptability	<---	Openness	.035	.725

Table 3: Goodness of Fit Indices for CFA and the Structural Models

Goodness of Fit Statistics	CFA	Structural Model	Recommended Values <sup>i</sup>
$\chi^2/df$	1.37	1.39	< 5
Root mean squared error approximation (RMSEA)	0.052	0.053	< 0.08
Goodness of fit index (GFI)	0.87	0.83	> 0.90
Parsimony goodness of fit index (PGFI)	0.65	0.68	>0.50
Parsimony normed fit index (PNFI)	0.72	0.71	>0.50
Comparative fit Index (CFI)	0.96	0.93	> 0.90
Tucker-Lewis Index (TLI) or Non-Normed Fit Index (NNFI)	0.95	0.92	> 0.90
Incremental Fit Index (IFI)	0.96	0.93	> 0.90

<sup>i</sup> Other than  $\chi^2/df$ , all recommended values are taken from Byrne(2010) <sup>ii</sup> Chiu, et al.(2006)

Table 4: Structural Model Path Coefficients

Estimate			Males		Females	
P			Estimate	P		
Cognitive Adaptability	<---	Agreeableness	.208	.835	1.114	.265
Cognitive Adaptability	<---	Conscientiousness	-.135	.893	-1.608	.108
<b>Cognitive Adaptability</b>	<---	<b>Neuroticism</b>	<b>2.045</b>	<b>.041</b>	.491	.623
<b>Cognitive Adaptability</b>	<---	<b>Extroversion</b>	<b>-2.099</b>	<b>.036</b>	-1.384	.166
Cognitive Adaptability	<---	Openness	1.453	.146	-.270	.787

Table 5: Goodness of Fit Indices for CFA and the Structural Models

Goodness of Fit Statistics	CFA	Structural Model (Multi-group)	Recommended Values <sup>i</sup>
$\chi^2/df$	1.37	1.27	< 5
Root mean squared error approximation (RMSEA)	0.052	0.04	< 0.08
Goodness of fit index (GFI)	0.87	0.75	> 0.90
Parsimony goodness of fit index (PGFI)	0.65	0.58	>0.50
Parsimony normed fit index (PNFI)	0.72	0.59	>0.50
Comparative fit Index (CFI)	0.96	0.92	> 0.90
Tucker-Lewis Index (TLI) or Non-Normed Fit Index (NNFI)	0.95	0.90	> 0.90
Incremental Fit Index (IFI)	0.96	0.92	> 0.90

<sup>i</sup> Other than  $\chi^2/df$ , all recommended values are taken from Byrne (2010), <sup>ii</sup> Chiu, et al.(2006)

In relation to first hypothesis which predicted a significant impact of different personality traits on cognitive adaptability, the findings confirm the impact of two personality traits i.e. extraversion and neuroticism on cognitive adaptability of individuals. Extraversion and neuroticism have a significant negative and positive impact on cognitive adaptability of entrepreneurs respectively. Apparently the negative impact of extraversion on cognitive adaptability seems strange, however, as it has been discussed in the literature review part, there is an interesting split among findings of the researchers regarding the likely relationship among extroversion trait of personality and cognitive adaptability. Finding of present thesis shows that extroversion has a significant negative impact on cognitive adaptability that means person having high score on extraversion tends to be less cognitively adaptive. This finding, which apparently looks strange, gives an empirical verification to the second school of thought according to which extroverts are not necessarily more adaptive.

## 6. Conclusion and future research

In their award winning article, (Academy of Management Review's decade award), Scott and Venkataraman (2000: 218) proposed that field of entrepreneurship is focused on the three basic streams of research inquires, "(1) why, when, and how opportunities for the creation of goods and services come into existence; (2) why, when, and how some people and not others discover and exploit these opportunities; and (3) why, when, and how different modes of action are used to exploit entrepreneurial opportunities". During the last decade an extensive research has focused on ontological and epistemological positions of entrepreneurship (Venkataraman, Sarasvathy, Dew, and Forster, 2012). To contribute to this ongoing debate, this study has attempted to answer "why, when, and how some people and not others discover and exploit entrepreneurial opportunities" stream of research through applying cognitive and environmental lenses. The result of study showed that two personality traits, Extraversion and Neuroticism do predict prevalence of cognitive adaptability among entrepreneurs. However, it is an interesting finding of the study that only personality of male can predict cognitive adaptability whereas among female entrepreneurs, personality is not a determinate of cognitive adaptability. That being so, though this study has not been able to

propose if male or female vary in cognitive adaptability in respect of personality; it has opened an exciting foray of future inquiry. Besides the need and opportunity of repeating this study in various research settings, culture contexts etc., the present study has indicated two new exciting and pertinent research opportunities. First, it has shown that contrary to the apparent concurrence of literature which posits neuroticism as negative state, characterized by anxiety and emotional instability, neuroticism has been found positively associated with cognitive adaptability. Further research on this phenomenon can explain the reason and possible explanation of this. Furthermore, findings of present thesis show that only personality of male can predict cognitive adaptability whereas among female entrepreneurs, personality is not a determinate of cognitive adaptability. Accordingly, to study “*why personality of males predicts cognitive adaptability and personality of females does not do it?*” present another opportunity for the future research.

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OFP-005

## Innovation and Creativity: Inspiring the Next Generation in the EtheKwini Municipality

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### Abstract

Innovation is not always born in a sterile lab or is not always about applications and technology. Innovative solutions to community challenges can be borne out of the creativity of community members. This was proven by Professor Anil Gupta who for more than two decades scoured rural India for its hidden innovations motivated by the belief that the most powerful ideas for fighting poverty and hardship will not come from corporate research labs, but from ordinary people struggling to survive. The EtheKwini Municipality is a city in South Africa which adopted a similar approach, recognising the innovativeness of youth (students and school pupils) in its area. The intention was to make the youth a part of the solution to challenges faced by the Municipality. In this regard five areas were selected and five groups of students were identified. Each group was sent into the community to identify challenges and engage with community leaders as well as members. Each group was tasked to come with solutions to these challenges which were to be presented at an Innovation Summit. The presented solutions were judged and the winning solution would be implemented by the Municipality. This paper documents the experience of the students as well as the kinds of solutions that were presented. The purpose is to highlight the importance of using the ingenious minds and creativity of youth and channel their energy into becoming part of society's solutions as opposed to being the problem.

### 1. Introduction

Innovation is the ability to create new value propositions through offering new products and services; adopting new operating practices: technological, organizational, or market-oriented; or creating new skills and competencies (Schumpeter, 1947). Innovation is in vogue. Companies want it. Places want it. Why? Successful companies and places depends more on innovation than ever before. Despite its lustre, many public and private sector leaders cannot really define innovation and therefore, stumble when trying to encourage or harness it. There are four challenges in trying to understand Innovation in Cities

- Understanding the integral link between private sector innovation and public innovation policy in economic development;
- Understanding that innovation comes in many forms and phases of production and development;
- Focusing on not just innovation in places, but innovation by places, i.e. states and localities must themselves try new policy approaches;
- And finally, creating partnerships between places, especially local places and the national government.

In this paper, the researcher documents the outcomes of an Innovation Trek which was done for the very first time in the EtheKwini Municipality. Professor Anil Gupta, for more than two decades, scoured rural India for its hidden innovations motivated by the belief that the most powerful ideas for fighting poverty and hardship will not come from corporate research labs, but from ordinary people struggling to survive. Such people will become the masters of social innovation. The EtheKwini Municipality is a city in South Africa which adopted a similar approach, recognising the innovativeness of youth (students and school pupils) in its area. The intention was to make the youth a part of the solution to challenges faced by the Municipality. In this regard five areas were selected and five groups of students were identified. Each group was sent into the community to identify challenges and engage with community leaders as well as members. Each group was tasked to come with solutions to these challenges which were to be presented at an Innovation Summit. The presented solutions were judged and the winning solution would be implemented by the Municipality. This paper documents the experience of the students as well as the kinds of solutions that were presented. The purpose is to highlight the importance of using the ingenious minds and creativity of youth and channel their energy into becoming part of society's solutions as opposed to being the problem.

### 2. Literature Review And Hypotheses

#### 2.1. Social Innovation

There has always been a debate about the definition of social innovation; however, a simple working definition of social innovation is that it refers to the creation, development, adoption, and integration of new concepts and practices that put people and the planet first. Social Innovations resolve existing social, cultural, economic, and environmental challenges. Some social innovations are systems-changing – they permanently alter the perceptions, behaviours, and structures that previously gave rise to these challenges. Even more simply, a social innovation is an idea that works for the public good. Social innovations come from individuals, groups or organizations, and can take place in the for-profit, non-profit and public sectors. Increasingly, they are happening in the spaces between these three sectors as perspectives collide to spark new of thinking. Social change is the result of a tremendously complex mix of ingredients. Environmental conditions, social conditions and individual actors collide to spark world-changing ideas. There is an underlying magic to social innovation that precludes any simple recipe for success.

Three important elements are important for social innovation:

1. Social innovation occurs best in diverse environments. The diversity leads to new opportunities and robust and flexible responses to common challenges. We don't create change by doing the same things we've always done. By introducing diversity we provoke discovery.
2. Social innovation needs a conducive physical environment. Social innovators need actual spaces to spark, develop and apply their ideas. Without access to resources and support structures, even the best ideas have trouble taking flight.
3. In addition to the physical space and a diverse mix of people, it is the interventions and learning opportunities that help make connections and stimulate new thoughts and ways of doing. You need to bring innovators together with capacity-building workshops, informal social mixers, our Intranet network, and more. Fostering individual and collective growth and create an environment that produces original action.

#### 2.2. Innovation and Cities

Urbanisation is a dominant trend worldwide, affecting economies, societies, cultures and the environment. More than half the world's population now

lives in cities and as much as two-thirds is expected to do so by 2050. In a study by the OECD (2012), the coming together of people, business and other activities in cities as a key process in the development and maturing of economies and societies. The study further pointed out how urban systems function is crucial to future economic prosperity and a better quality of life for more than three billion people, and counting.

Cities don't necessarily foster the emergence of new ideas but, by bringing together the required infrastructure and markets, they do make it easier to turn ideas into practical, marketable solutions. Cities are home to more than half the people living in OECD countries and almost 50 % of the output and jobs of many nations is found in their largest city. Though most cities have higher economic growth, foreign investment and labour productivity than the rest of the country, they are also more polluted, crime-ridden and socially disparate.

In another study by the OECD (2006) on Competitive cities in the Global economy argued that there is no 'one size fits all' policy for cities. But the report makes the following recommendations which include the following:

- A flexible strategic vision is necessary to foster competitiveness,
- Liveable cities with high-quality infrastructure, green spaces, and inner city residential areas and public projects can contribute to economic success
- Effective governance of cities depends on leadership from the national government to encourage reform at different levels
- To balance the financial needs of cities with those of the rest of the country, cities can diversify tax revenues with 'smart taxes' such as congestion charges and use public-private partnerships to raise money for public projects.

### 3. The Ethekwini Municipality

#### 3.1. The study area

Ethekwini Municipality is a metropolitan region with a predominantly urban population. It is located on the east coast of South Africa in the Province of KwaZulu-Natal (KZN). The Municipality spans an area of approximately 2297km<sup>2</sup> and is home to some 3.5 million people. It consists of a diverse society which faces various social, economic, environmental and governance challenges. As a result it strives to address these challenges which mean meeting the needs of an ever increasing population

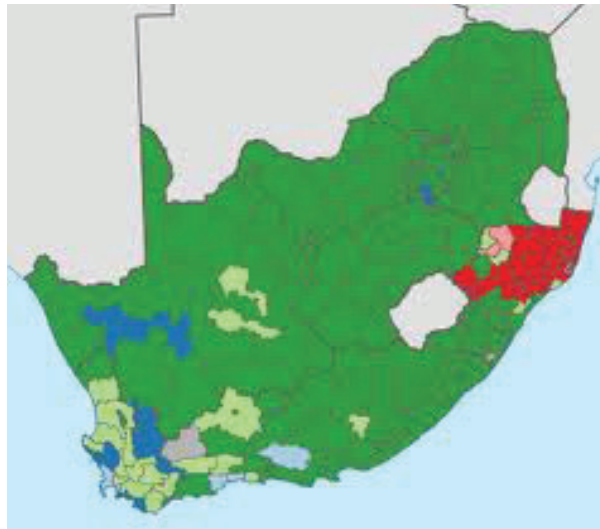


Figure 1: Ethekwini Municipality in Context of South Africa (shown in red)

The people who reside within the municipal area consist of individuals from different ethnic backgrounds. The majority of the population come from the African community (71%) followed by the Indian community (19%), White community (8%) and the Coloured community (2%). Individuals within the 15-34 year age group comprise the majority of the population. The greatest population concentrations occur in the central and north regions. The central region is the Urban Core of the municipality and is home to approximately 1.30 million people (34%). It is followed by the northern region which is home to approximately 1, 15 million people (31%). The south accommodates approximately 730 000 people (18%) and the outer west region accommodates the least number of people with a total population of approximately 577 500 people (16.5) (Census 2001 & 2007).

#### 3.2. Innovation in Ethekwini Municipality

The Ethekwini Municipality has recognised that Innovation should be embraced across every sector of work we are involved in. The Ethekwini Municipality prides itself in the fact that it is a learning city and as such we are always aspiring to optimize our internal capacity and external services through creative thinking and innovative initiatives. Our vision is to accelerate innovation to deliver the objectives of employment creation.

The Ethekwini Municipality has developed an Innovation programme to achieve the following:

- It is designed to bring together the demand (business) and supply agents (education) to solve real challenges of communities and answer the markets need
- It will focus on solving problems, rather than innovating for innovation sake and assist in driving market competitiveness
- It is designed to improve the sectors access to information, incentives and financial support, making businesses and communities more efficient and driver performance improvement
- To create an enabling environment for individuals, business and the community to innovate
- Understanding the key insight that the benefits of innovation is widely accepted, the challenge lie in being able to unlock it in order to realise its value

**3.2.1. The Innovation Trek**

The idea for the Innovation Trek was inspired by the work of Prof Anil Gupta from India who walked great distances in rural India looking for innovations that could improve the life of ordinary poor people. Just through his journey Prof Gupta and his aides' uncovered 25000 inventions from the bicycle mounted crop sprayer to the electric paintbrush that never needs to be dipped in paint can. Many of the cheap simple ideas he spread for free from one village to the next with the inventors blessing. Some he is working to bring to market, ensuring that the Innovator gets the credit as well as the profit. Every time he visited a place, he discovered a solution that he would not even have imagined. Many of his finds focused on agriculture from a more productive strain of peppers, a makeshift seat that makes coconut harvesters rest high up in the trees, and a hollow spear that pierces a hole in the ground and drops a seed. Prof Gupta has received the Padma Shri, one of the Indian government's top honours.

In rural South Africa, Trevor Field, a retired advertising executive, had done well in life and wanted to give back to his community. He noticed that in many rural villages around the Eastern Cape, the burden of collecting water fell mainly to the women and girls of the household. Each morning, he'd see them set off to the nearest borehole to collect water. They used leaky and often contaminated hand-pumps to collect the water, and then they carried it back through the bush in buckets weighing 40 pounds. It was exhausting and time-consuming work.

According to Field, "the amount of time these women are burning up collecting water, they could be at home looking after their kids, teaching their kids, being loving mothers,". He knew there had to be a better solution. Field then teamed up with an inventor and came up with the "play pump" -- a children's merry-go-round that pumps clean, safe drinking water from a deep borehole every time the children start to spin. Soup to nuts, the whole operation takes a few hours to install and costs around \$7,000. Field's idea proved so inventive, so cost-efficient and so much fun for the kids that World Bank recognized it as one of the best new grassroots ideas.

**3.2.2. The Ethekwini Innovation Trek**

The Innovation Trek consisted of a one day outing allowing groups, consisting of local high school participants of the Innovation Conference, to set out into eThekweni areas that face different issues in the community and find ways to solve these issues. These innovative solutions were to be showcased at the conference and the winning group was awarded for their contribution, as well as have their solution implemented. It is important for Innovation to start to change lives and impact people in every aspect of their lives. It is equally important for people to realise that innovation is not only about the big things, it's also about the little changes in our thinking, our systems and processes we introduce to improve the quality of life of all our citizens, it all starts with an idea.....and the idea starts with us.

**Area One: ITRUMP**

The iTRUMP programme drives regeneration and urban management in the inner city. A complex range of issues from stemming the tide of office flight to suburbs to dealing with the urban poor, informal trading and the like, require new innovative and interdisciplinary programmes.

The Challenge that was presented was the lack of management and monitoring of street trading. The problems of managing street trading in prohibited areas have developed in many parts of the inner city particularly in the Warwick Junction Area. The key challenges they face are:

- How does one encourage street traders to keep their environment tidy and ensure they are compliant to city by laws and regulations?
- How do we encourage a culture of entrepreneurship amongst street traders?

The group developed a mobile trading stand that could be moved at the end of the trading day thereby eliminating the waste and subsequent management issues associated with trading. The Mosolar was to be solar powered providing either heating or cooling depending on what was needed by the trader. It had an area allocated for waste disposable ensuring that the area around it was clean at the end of a trading day.

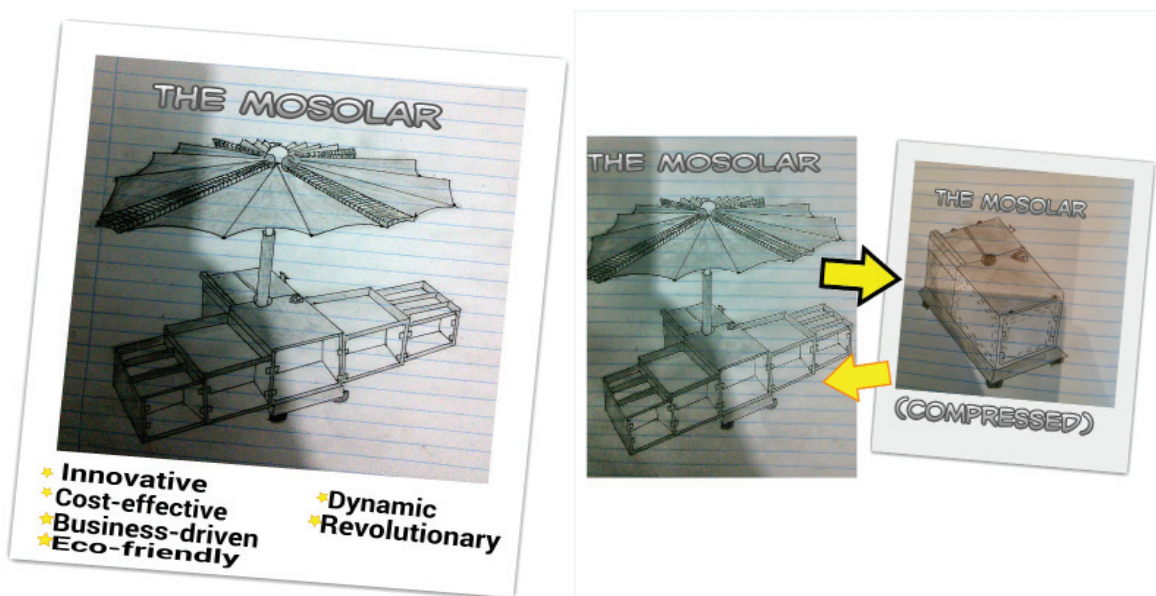


Figure 2: Proposed mobile solar trading Unit

**Area 2: Cato Manor**

Cato Manor is an inner-city residential area which was the focus of the forced removal of over 150,000 people during the 1950s and 1960s and more recently it has been the beneficiary of a major Presidential Lead Programme of infrastructural projects over the past ten years. Now the focus is on economic and social development. The challenge that the area faced was a very under-utilised Youth Development Centre. The questions asked included the following:

- How do you get the youth to take the initiative in joining the Centre?
- How do we inform and market to the youth to be involved?
- How do we develop the programs that happen in the youth Centre?
- Provide an interactive platform for communication between NGOs.

The solution proposed by the group was an application which would provide a blueprint year plan with step by step guide to organising projects with contact details of various stakeholders in various areas for month to month projects. It would also provide a forum for discussion of strengths and weaknesses of projects as well as recommendations for future projects

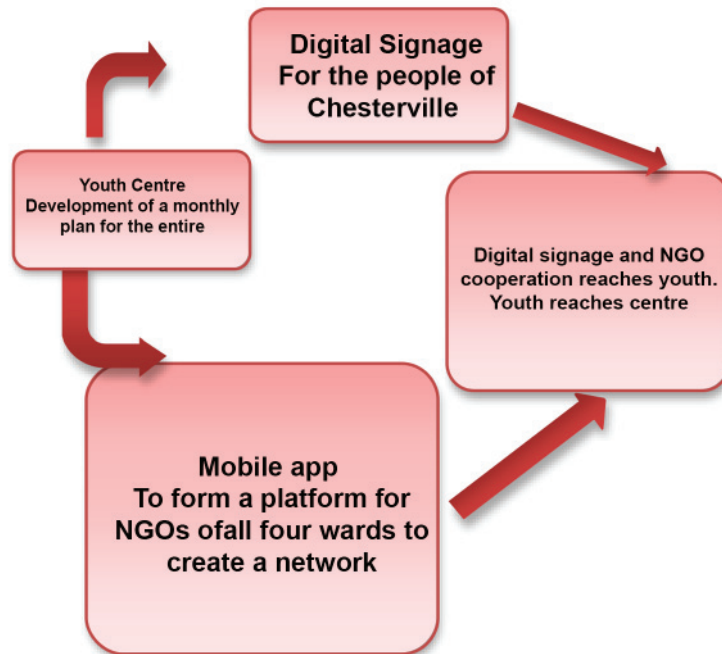


Figure 3: Diagrammatic representation of Electronic Application for the Youth centre

The group selected the Application as a solution for the following reasons:

- It serves as a great networking platform for NGOs – share common goals and uses latent human capital.
- It saves money – compresses time and space.
- It promotes greater efficiency and productivity.
- It provides and promotes 'self-help'.
- It saves the environment since there is less travel involved therefore less pollution.
- It also results in reduced waste since no printing is necessary.

**Area 3. PHOENIX, INANDA, NTUZUMA, KWAMASHU (PINK)**

The second largest black African township settlement in the country is located some 30 kilometres north of the CBD and contains well over half a million people with almost no economic opportunities or even tertiary education facilities exist to serve the residents. This presidential programme is about generating economic activity as well as revitalizing residential and community areas.

The challenge faced by the area was a lack of positive activities as well as information required to motivate youth in that area which ultimately leads to social issues such as gangsterism, drug and alcohol abuse and crime within the community.

The solution proposed by the group was the "I AM BOX" which was infrastructure designed to facilitate easy access of the youth to Information. The idea was that the box was to be powered by solar power and be internet based and provide youth with information on careers opportunities, bursaries, internships, and skill's training. The intention was increase access of the youth in this area to Information that was cutting edge, real-time, innovative and motivated them to follow positive pursuits.



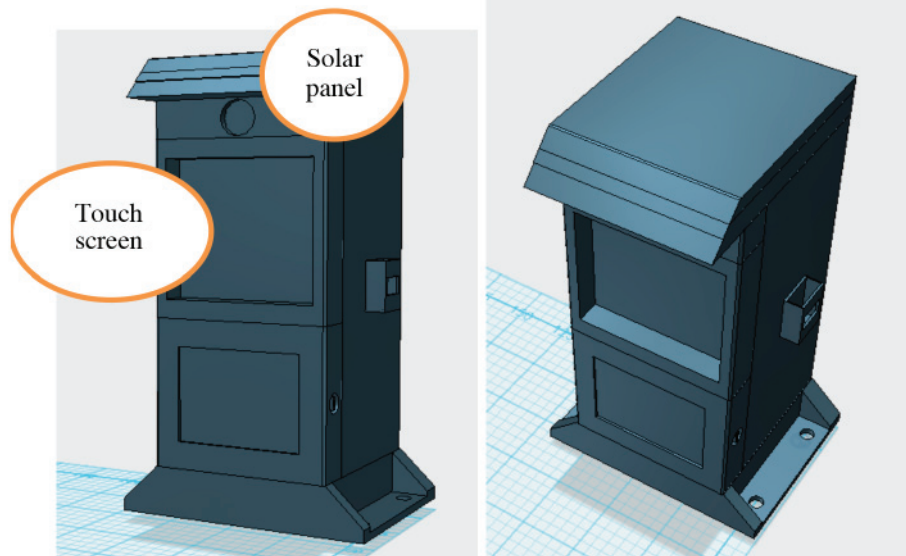


Figure 4: Representation of the “I AM BOX”

#### 4. The Lessons

The Innovation Trek was an amazing revelation that young people and people from communities can come up with social innovations that increases and contributes to economic development and addresses many of the social challenges faced by communities. Economic development depends on the innovative capability of a society to generate goods and services that, at prevailing factor prices, are higher quality and lower cost than those that were previously available. So defined, innovation makes it possible, although by no means inevitable, to improve the economic positions of many different groups of people – workers, managers, financiers, consumers, and governments – who participate in the economy. Social institutions will determine how the gains from innovation are distributed among participants in the economy, while the distribution of the gains from innovation will influence the incentives of participants in the economy to contribute their skills and efforts to innovation. In this case, the Municipality will hold further engagements with the groups and the community stakeholders to encourage implementation and to see to what extent the proposed innovations could attract investment from private sector as well as communities. The Trek will certainly set a new trend of engaging communities constructively and ensuring that they become part of the solutions to the various social challenges being faced by communities.

#### 5. Conclusion

As we move into the future we need to start thinking about how we are going to deal with the effects of climate change, poverty and peak oil that may be upon us sooner than we think. By encouraging innovation, creativity and learning amongst our practitioners it is hoped that we as a municipality will be able to be resilient and adapt to these challenges converting them into opportunities. Rapid change is always scary for incumbents, but if you're not an incumbent, you have nothing to lose. Innovation is hard for large companies and entrepreneurs alike because you need to be long-term oriented. And since the innovative projects are such a tiny part of a large company, there is tendency to be dismissive of the innovation. **“You need a culture that high-fives small and innovative ideas and senior executives who encourage ideas.** In order to change the face of entrepreneurship in South Africa, we need to embrace an Innovative culture that will pave the way for Economic growth and job creation. Innovation ensures a sustained future for generations to follow!!!!

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## OFP-006

**The Determinants of Innovation in Malaysian Food Processing Small and Medium Enterprises (SMEs)**M. D. Suziyana<sup>a</sup>, N. K. Ahmad Nazif<sup>a</sup>, H. Rabiatul Syuhada<sup>a</sup>, M. Z. Nurhaizan<sup>a</sup> I. Fadzida<sup>a</sup>*<sup>a</sup>Faculty of Industrial Management, Universiti Malaysia Pahang (UMP), Lebuhraya Tun Razak 26300 Gambang, Kuantan, Pahang, Malaysia***Abstract**

Innovativeness of a new product and Small and Medium Enterprise (SME) innovation capability is important to present opportunities for SMEs in terms of growth and expansion into new areas as well as allow SMEs to gain competitive advantage. Realising the essential contribution of food processing SMEs towards Malaysia's economic growth, various incentives and assistance formulated by government to stimulate them to become more aggressive in undertaking innovative activities. Such innovation initiatives are driven by various factors such as changes in consumers' preferences, technological change, research and development activities, skills of workforce and many more. This paper discusses the innovation successfulness among food processing SMEs in Pahang, Malaysia. It aims to study the factors which determine innovation activities in food processing SMEs and which of them are the most influencing one. The key factors studied were identified as firm culture, firm innovation management, experience with innovation, appropriate resources allocation, and freedom to innovate. The respondents involved were 85 SME's owner, who had been approached through survey. By using Statistical Package for the Social Sciences (SPSS), the result obtained by finding the mean value for each of the item assessed. Results revealed that the appropriate resources allocation is the most influencing determinants of innovation successfulness among food processing SMEs. Two main firm's resources; time and money found to be the major aspect in business field which needs to be managed systematically and properly. The findings are mainly benefited the SMEs owners and related government agencies in restructuring the strategies towards more efficient innovation adoption and implementation.

**1. Introduction**

Innovation is something that totally outstanding and unavailable, something that no one had ever made it before. Nowadays, it has become first goals for most companies to create tremendous innovation. Companies should keep searching for new ideas and creativity in creating new market opportunity in arising need of globalization. A company should not only focus on meeting customers' requirement and reducing production cost, but also to be innovative and distinctive from their competitors. Innovation pressures apply to large company as well as SMEs (Vracking and Conzjnsen, 1997). The pressure made SMEs are often more fertile than larger firms in terms of innovation (Afuah, 1998). But somehow, innovation plays a crucial role in determining SMEs long term survival and their economic growth. Without innovation, SMEs are hardly to compete in rapidly changing industry and to grow their business level.

Some of SMEs applied innovation in their product or process but many of them failed. Compared to larger firm, SMEs are easier to adopt innovation as they are more flexible to change their product or process. They have advantage over the large firms but they also need skills to carry out innovation. The factors which drive innovation need to be identified and manipulated in order to gain competitive advantage over the other firms. From previously conducted research, it is found that lack on innovation culture as being one of the main problems faced by most companies which restraint them to be competitive in many industries. Awareness regarding the significance of innovation is still at low level and yet not been fully focused by many companies. Past researches in many countries also indicated that small and very small food processing enterprises are innovative compared with other industries. Several factors such as less awareness of what changes of customer want and less financial support to make changes were some of the barriers faced by the SMEs.

The area of factor that act as the main driver of innovation in SME context is largely unexplored and still does not have any clear view. Thus, it is the aim of this paper to find out and understand more how food processing industry adapt innovation in their business activities and what factors that currently vital to innovation success.

**2. Literature Review***2.1. Innovation in Food Processing SMEs*

In the past decade, innovation had been acknowledged as the most important determinant in business survival and competitiveness. Innovation can be defined as the process of turning opportunity into new ideas and putting these into widely used practice (Tidd, 2001). These new ideas can create a better product or service in order to keep business sustain and continually develop. Innovation fuels organizational growth, drives future success, and is the engine that allows businesses to sustain their viability in a global economy (Gaynor, 2002). For companies keeping their business keep moving on and leading the competitive world market, pursuing the effective management, lowering production cost, or offering the lowest price won't be enough. The companies must be able to create and commercialize a stream of new products and processes that extend the technology frontier, while at the same time keeping a step or two ahead of their competitors (Porter, 2001). All the competitive features of a business should unite together with innovativeness to achieve the highest business performance.

Small and medium enterprises (SMEs) are considered to be the engine of economic growth and employment in Malaysia. The latest statistics indicate that SMEs constitute 99.2% of the total business establishments or totalling 548,267 enterprises, and contribute about 32% of GDP and 59% of total employment (SME Corp Malaysia, 2012). The development of SMEs has been recognised as an integral component for achieving sustainable economic growth and the developed country status by 2020. Due to their sheer numbers, size and nature of operations, the role of SMEs in promoting endogenous sources of growth and strengthening the infrastructure for accelerated economic expansion and development in Malaysia has been recognised (Normah, 2007). One of the primary means through which SMEs are expected to accomplish this task is by developing and commercialising innovations.

Innovativeness of a new product and SME innovation capability is important to present opportunities for SMEs in terms of growth and expansion into new areas as well as allow SMEs to gain competitive advantage.

In Malaysia, the food processing industry is dominated by small and medium scale companies which represents more than 98% (5,925) of the total establishments (6,069) (Syed Shah et al., 2011). In 2010, the food industry contributed about 10% of the Malaysian manufacturing output attracted a total of RM1,972 billion in 69 projects. During the period of the Second Industrial Master Plan (IMP2) 1996-2005, the contribution of the industry to the total manufacturing output had increased from 6.1% in 1996 to 9.9% in 2005 (Musalmah, 2008). The processed food products have become the choice of many Malaysians due to the increasing trend of their standard of living and purchasing power. The Malaysian SMEs in the food sector are driven to operate to contribute to household income, for self-employment and the growing demand of international markets in particular for *halal* foods (SMIDEC, 2009). In addition, with a Muslim population of 60%, the demand for *halal* foods by Malaysian consumers has increased over the years. It was estimated that the potential value of the *halal* food industry range between USD600 billion and USD2.1 trillion, which provides immense opportunities for Malaysian food processing companies (Brandt and Chuah, 2012). The changes of Malaysian lifestyle have resulted to an increase in the demand for convenience food and healthy food which in turn has led to innovative new products in the food processed based SMEs in Malaysia (Mohd Fauzi and Syed Shah Alam, 2011). Such innovation initiatives are driven by various factors such as changes in consumers' preferences, technological change, research and development activities, skills of workforce and many more.

The food industry is faced with a period of rapid change, driven by globalization, trade liberalization, development of genetic, processing and information technology, intellectual property rights, changes in family structure and health and food safety concerns. Innovation is considered as the key elements for successfully compete in the increasing global competitive environment. Without continuous improvement and innovation, small firms cannot preserve and survive in this rapid changing world. Thus, food processing industry in Malaysia is critically needs further development and support plan in future.

## 2.2 Drivers of Successful Innovation

There are a lot of factors which determines the innovation success in SME business context from the past researches. Many of the factors affect the SME performance in different angle as the factors come in different aspect and categories. Prior research has identified a number of factors such as size of the firm, the level of training of the firm's labour force, age of the firm and the firm's sector of activity (Avermaete, et al., 2003; Marques, 2009). Jamrog (2006) identified customer centricity, teamwork, the appropriate resources and organizational communication as the most important drivers of innovation. The ability to select the right ideas and freedom to innovate are another factors of innovation success pointed by Gerben et al., (2003). For the purpose of this research, five factors had been determined to suit with the typical SME industry context. The five factors are listed as firm culture, experience with innovation, the firm's strategy towards innovation, appropriate allocation of resources and freedom to innovate.

### 2.2.1 Firm's Culture

Cultures relate to the values and beliefs of the organization and how this impacts the management of innovation in the SME firms. Organizational culture often related to how an organization functions and the value it shows while running the business. It is also the most commonly discussed factors relating to an organization's ability to manage innovation firms (Smith, 2008). A good culture practices in an organization will foster better adoption of innovation into the organization. One of the firm's cultures that SME should practices is mutual trust between owner and workers. Owner should giving trust to their worker by teaching and by letting them to hold some authority in managing their work.

### 2.2.2 Experience with Innovation

Past experience conducting innovation projects is one of the main factors lead to successful innovation. The experience gained will enhance the skills and knowledge of the managing teams in SME companies. By learning-by doing from past experience, SME owners will know a lot much better knowledge compared to those who never experience in innovation project before. They will know the innovation techniques which teach them how to adapt and generate innovative ideas in their company.

### 2.2.3 Firm's Strategy towards Innovation

From previous research and empirical study, there are many innovation strategies can be followed by SME owners. The most common typology is between pro-active and re-active strategies (Gerben et al., 2003). Pro-active strategies pursue product innovations in order to obtain product leadership in the market, whereas re-active strategies pursue product development as a safeguard against competing products of others.

### 2.2.4 Appropriate Resources Allocation

Improper resources assigning whether too much or too little can hugely affect business performances. Assigning proper resources in optimize amount will resulting better routes to achieve innovative company. In context of time resources, employees with long spans of time in which to come up with results may lose motivation. Meanwhile, in the context of money, proper utilization of business financial is also important. Too little, and employees have to devote time and energy to seeking other resources. But too much (beyond the "threshold of sufficiency") has not been shown to have a positive effect on creativity (Troy, 2004). Researchers used appropriate time and money allocation as measures to evaluate resources allocation as one of the factor of innovation in food processing SMEs in Malaysia.

### 2.2.5 Freedom to Innovate

Give freedom to workers to suggest any new and creative ideas also one of factors that contribute innovativeness in food processing SMEs. This does mean that every suggested idea had to be implementing, but showing their ideas critical and important to firm's triumph. Through the research of innovation experts, McLean (2005) concluded that few types of control can inhibit creative performance. Too much control and restriction could make the worker feel they are eligible to give suggestion and contribute to the firm. Beside freedom to innovate, SME also need to carefully select the right ideas to be implemented in business. Selecting the right ideas is important as not all the ideas are considered creative and innovative.

**3.0 Methodology**

A quantitative methodology using a survey questionnaire was utilized to collect data directly from respondents.

*3.1. Questionnaire Design*

The questionnaire consists of two different sections. Section A consists of introductory question which embrace demographic information regarding themselves and their company. This section requires the respondents' answer on their gender, age, races and the product produced by their company. Section B is developed to obtain information related to the determinants of innovation initiatives in Malaysian food processing SMEs. Likert scale is used to scale respondents' preference on which of the factors is the influential one based on their experience in running SME. Overall, 10 items using 5 Likert-type scale are used to measure the five factors - firm's culture, experience with innovation, firm's strategy towards innovation, appropriate resources allocation and freedom to innovate.

*3.2. Survey Implementation*

The respondents of this survey were the food processing SMEs owners or managers around Pahang, Malaysia. Pahang was chosen as targeted study area as it is the largest state in Peninsular Malaysia. Food processing industries are varied in the type of product produced and the process used to produce the product. It is also known rich in marine resources such as fish, cuttlefish, and many other marines' life. This has contributed to the growth of local food processing industry and the economic status. 92 questionnaires were distributed to the respondents but only 85 of them were collected and used in this study.

**4.0 Data Analysis and Results**

Statistical Package for the Social Sciences (SPSS) was used to analyse the data. Two analyses have been conducted in this study; analysis of the respondents' demographic and analysis of factors influencing innovation of food processing SMEs.

*4.1 Analysis of Respondents' Demographic*

Summary of the demographic analysis of the respondents is tabulated in Table 1. Six elements of demographics have been analyzed such as gender, age and race of the owner, education level, years of business operation, and types of food product. Most of the companies run by male with the range of age between 26 to 35 years old. From 85 respondents, 81.2% of them are Malay and averagely SPM level of their education. Most companies have been operated for around 1 – 5 years and they involved in production of snack/chips products.

Table 1: Summary of Demographic Analysis of the Respondents

Demographic Profile	Attributes	Percentage (%)	Majority
Gender	Male	57.60	Male
	Female	42.40	
Age	25 years old or less	28.20	26-35 years old
	26-35 years old	31.80	
	36-45 years old	30.60	
	46 years old and above	9.40	
Races	Malay	81.20	Malay
	Chinese	14.10	
	Indian	4.70	
Education background	No formal education	15.30	SPM
	PMR/SRP	5.90	
	SPM	38.80	
	Certificate	9.40	
	Diploma	22.40	
Company's years of operation	Less than a year	20.0	1-5 years
	1-5 years	61.20	
	6-10 years	15.30	
	More than 10 years	3.50	
Types of food produced	Fish based product	14.10	Snack/chips
	Frozen product	20.00	
	Bakery product	20.00	
	Coco based product	9.40	
	Cereal product	4.70	
	Snack/chip	22.40	
	Beverages	5.90	
Others	3.50		

4.2 Analysis of Factors Influencing Innovation

The purpose of the analysis is to identify which factor of innovation is the most influencing in Malaysian food processing SMEs. Table 2 illustrates the analysis result of all five factors. Appropriate resource allocation gives the most influence on the innovation initiatives as the mean value of the factor is 4.475. Resources allocation is the management of many aspects such as financial, raw materials, time, and many others. Having appropriate resources quantity allocation is also critical in determining innovation successfulness as having too few resources hinders innovation, but having too many might also be a kind of obstacle (McLean, 2005). This finding is parallel with Jamrog (2006) claim which stated that appropriate resources are the most important driver of innovation. The importance of resources allocation activities has long been recognized by management scholars as well as economists. The resources allocation process is a major aspect in determining organizational development and improvement. Thus, there is no doubt that resources allocation the most critical factor in determining innovation successfulness in an organization.

The second factor is firm culture. Firm culture is a way how the company run and operated whether in effective or productive manner and how the owner works with their employees. Calantone et al., (1993) claimed that well defined arrangements concerning all departments' tasks and responsibilities will lead to cultural susceptibility of innovation. Firm cultures are also important for the SMEs to adapt new technological advancement. Firm culture is undisputedly considered crucial to the firm's technological capabilities in the long term. Firm culture can be considered as collectively nature of firm's action towards innovation successfulness.

Then, the third determinant of innovation is firm innovation management. Firm innovation management is a way how company plan and execute their new and innovative product or process. Firm innovation management has been addressed as one of the critical success factor. First, it provides a guideline for dealing with strategic issues (Lester, 1998). Then it strategically planned projects to enable the firm to take advantage of synergy between parallel innovation projects (Gerben et al., 2003).

The forth factor is freedom to innovate. Freedom to innovate is giving a space for employees and customers to voice out their opinions and thought regarding any possible innovations can be made to the company's product or process. Amabile (1996) claimed that too much control can impede creativity and innovation. This supported by McLean (2005), who concluded that several types of control can inhibit creative performance.

The last and least influencing factor of innovation is experience with innovation. Past experiences are meaningless if the workers are not adapting to the new knowledge and technology which changes rapidly over time. But somehow, this factor cannot be brushed aside lightly. According to Gerben et al. (2003), previous engagements in innovative projects are conducive to the firm's technological capabilities as these enhance skills decisive for the course of innovation projects. In other words, experience with innovation does give important value in adapting innovation.

Table 2: Average Mean Value Summary for Each of the Factors of Innovation

Factor	Question	N	Mean	Average Mean	Ranking
Firm Culture	B1a	85	4.18	4.135	2
	B1b	85	4.09		
Experience with Innovation	B2a	85	3.15	3.365	5
	B2b	85	3.58		
Firm Innovation Management	B3a	85	3.93	4.075	3
	B3b	85	4.22		
Appropriate Resources Allocation	B4a	85	4.36	4.475	1
	B4b	85	4.59		
Freedom to Innovate	B5a	85	3.68	3.585	4
	B5b	85	3.49		

5.0 Conclusion

Worldwide growth of food processing industry had rapidly swelled through time. Its significant contribution to the society and economic growth cannot be denied. Innovation in food processing industry is a major key for this industry to grow larger in future. This survey, which was conducted on 85 Malaysian food processing SMEs, highlighted the identification of factors which influence the successfulness of innovation initiatives. It was found that the most influencing factor is appropriate resources allocation, followed by firm culture, firm innovation management, freedom to innovate and experience with innovation factor.

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OFP-007

## Entrepreneurial Capabilities of Sama College Students of Dezful Branch

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### Abstract

Since students in higher education institutions, after graduation are entered in unstable environment, thus the importance of using of knowledge learned has a special position. Training is one of the most important aspects of entrepreneurship which has been discussed. Studies have proven that characteristics of entrepreneurs are most acquisitive not hereditary. It is noteworthy that how students entrepreneurial ability and effectiveness of entrepreneurship courses at universities on students achievement and insights of creating innovative business can be measured and evaluated. The study aimed to investigate the entrepreneurial capabilities of students of SAMA college DEZFUL Branch in 2011, and is a survey. The results indicate that entrepreneurial capabilities of students is higher than average and no significant difference in the capabilities of SAMA college students were observed. It was observed that the entrepreneurial ability of the students of physical education is higher than other students. Therefore, it is suggested that teachers use new methods in teaching entrepreneurship course, increasing short periods which affect entrepreneurial spirit and entrepreneurship courses be designed for higher level in universities, meanwhile, authorities, pay particular attention to practical training from pre-school periods.

### 1. Introduction

Education is one the most important aspect of entrepreneurship development, which has given a special attention. According to studies have been done so far, entrepreneur features are to be acquired and not to be inherited. For that reason, educating different aspects of entrepreneurship have turned to be one of the most important operations in universities. Since graduated students from universities are entering into dynamic environments, that is really important to be able to apply their educated features. Needless to say that knowledge without applicability is nothing. Knowledge can have positive effects on life and society just when it is applied. With a gap between knowledge and applicability, it leads knowledge not to be able to become value. Many of graduated students from universities have acquired their expertise very well in their special fields. They are a very useful knowledge reserves but they cannot put their knowledge in practice. In other word, these days, students expect different services from their universities. So, the universities must understand their needs and set a balance up among students' needs and educational services. According to the cited cases and with considering the essence of researcher's job, this is to be given more attention that How the students entrepreneurship applicability and its efficiency in entrepreneurship terms in universities and its effect on student's success and creative work and innovation would be evaluate? For that reason, researcher wants to put the different aspects of this subject into a scientific study, because having a better knowledge about this subject would improve the education aspects in universities and could be useful for university managers to apply the results in their planning.

### 2. Literature Review And Hypotheses

For the first time, David Mc Klend (1976) studied the psychological features of entrepreneur in terms of the achievement motivation. Rater (1986) studied extrinsic and intrinsic controlling. Tending to take risk is one of the features that has been studied by Naight (1921). Karsrd, Ulm and Eddy (1986) examined and tested the thought of self-respect and self-esteem. Hadad Adel's findings showed the significant relation among gender, age and entrepreneurship. By increasing the level of education, especially higher than B.A., the possibility entrepreneurship would be increased. The students, graduated from abroad colleges, are more entrepreneurial than graduated students from local universities. The educational level of entrepreneur's parents is higher than non-entrepreneur's. His research also found that in the group of entrepreneurs "need to improve", "independence", "tend to be creative", "risk-taking", "determination" comparing to non-entrepreneurs is significantly higher.

Azizi (2003) in order to determine the areas of entrepreneurship development in students, showed that among the variables of tolerance, confidence, self-control, achievement, risk taking, innovation and entrepreneurship independence there is a positive relation. Jafarzadeh (2004) findings in terms of Identifying and assess the relationship between the various characteristics of college graduates with the degree of entrepreneurial and designing of a model to predict the graduates' abilities in entrepreneurship showed that the Psychological and management characteristics play the most important of role in entrepreneurship. At the next step, it also showed that the educational, environmental and demographic characteristic have the highest influence. Rastakhiz Paydar's study (2005) showed the higher level of entrepreneurship in men, comparing with women. About the age variables, some evidences showed that there is no significant relation between age and entrepreneurship. Kvyrlsky's findings (1980, quoted Rashid, 2000) emphasized the importance of creativity and self-confidence. The study of Rashid (2000) on the role of education to enhance entrepreneurial attitude and character was concluded that people who were trained in entrepreneurship achieved higher score on achievement motivation, self-control, self-esteem and creativity. Pystrvy and his colleagues (2001) in their study, about the Chinese entrepreneurs, examined the influence of family and culture in developing and shaping the SMEs. This study also investigate the role of motivations and demographic characteristics in establishing an entrepreneur companies. The findings suggested that most important motivation of entrepreneurs is achieving personal independence and continuing their progress beside their family. In China, family is playing an active role in shaping and developing the companies. The average age of an entrepreneur is 37 years old. The results also showed that entrepreneurship is not exclusively for men and gender is not an effective feature in starting-up a company. Most entrepreneurs have an academic degree and have work experience. Hezarjarib (2003) in order to assess the entrepreneurial graduates in the humanities, through social and cultural magazines in Tehran stated that there is a positive significant relationship among the characteristics of entrepreneurship and having a formal university training, personal skills, personal motivation, risk taking, the need for success and creativity. After that Yaraie (2004) evaluated the overall level of entrepreneurial spirit, among students of Shiraz University, that was very low. Badri Tayeb Lo (2005) stated that there is a significant relation among the entrepreneurial ability and independence, internal control, progress motivation creativity for Isfahan university students. Ghaffari in 2008 stated that



entrepreneurship abilities among students in Arak PNU in terms of independence, internal control, progress motivation and creativity is higher than average and also university academic education also was not effective in the development of entrepreneurial capabilities.

**3. Methodology**

*3.1. Research Goal*

The purpose of this study is to evaluate the capabilities of entrepreneurship in terms of the indicators of independence, internal control, progress motivation, risk-taking and creativity of Sama, Dezful branch, college students and also to assess the impact of university academic education on increasing these capabilities.

*3.2. Sample and Data Collection*

This study is applicable type of research and according to the nature and objectives used descriptive method. In Survey researches, researcher objectively describe the regular features of a situation, or an issue without any intervention or mental inference. At the end, researcher presents the objective results of situation. The population of this study consisted of all students, both girls and boys of technical college of Sama university of Dezful Branch, studying during the academic year of 1388-89. According to Statistics, 1576 students were studying in Sama Technical college during the academic year of 1388- 89 (1024 boys and 552 girls.). In this study the process of sampling of students is randomly. According to the student population, 120 students are selected as samples and put under investigation. Students groups are given in table (3-2) and (3-1) in terms of their gender and their field of study. For this study, a questionnaire with 42 questions was prepared. The style of designing the questionnaires was in this way that at first step, all the necessary sources in the area of subject were prepared and studied. With regard to the objectives of this study the questionnaire included some open questions and they were given to randomly selected students. After the implementation of this part of the study, the students' comments were collected and put under investigation. And also a number of professors, teaching entrepreneurship were interviewed get more familiar with the capabilities of the students. In the middle stage, according to the received information from sources, a preliminary question nary including close questions, was prepared. This questionnaire (the pilot) was given to about 50 people of the population (students of technical and vocational college of Sama Dezfoul). After collecting comments and suggestions from them and use them in the final version, the final questionnaire with entrepreneurship capabilities of the students were ready to run at the end of the study.

Table 1. Distribution of the sample by gender

Gender	Frequency	Percent
Male	60	50
Female	60	50
Total	120	100

Table 2. Distribution groups for each discipline

Discipline	Frequency	Percent
Computer	40	33/3
Accountant	40	33/3
Physical Education	40	33/3
Total	120	100

*3.3. Analyses and Results*

In this study, descriptive statistics approach was used (provided by the frequency, percentage, mean and standard deviation to describe the response to the questionnaire). Cronbach's alpha were used to assess reliability. And finally to compare the views of students about entrepreneurship capabilities T-Test were used. To assess students' entrepreneurial capabilities, 4 hypotheses were defined. Using T-Test, being significant or non-significant of data was examined. At the next step, the validity or invalidity of each hypothesis was assessed and assumptions have come forth in Table 3.

Table 3. Considered hypotheses

As hypothesized	
1	Entrepreneurship capabilities of the students is higher than average.
2	There are significant differences between the freshmen and senior entrepreneurial capabilities.
3	Entrepreneurship capabilities of the students who have passed the course entrepreneurship and have not passed are significantly different. Also there is no relation among student's gender and average with their Entrepreneurship.
4	The entrepreneurial ability of students in different disciplines is significantly different.

To investigate the hypothesis 1, and then calculating the average of the scores obtained by the subjects. The average of subjects which were lower than the total average and those who were higher than total average were calculated and then were comparing by T-Test. The results showed that there are significant differences. It should be noted that the purpose of the entrepreneurship capabilities is the students 'total score that each subject has been obtained from the questionnaire. According to the above table and calculating the T-test ( $p=0$ ,  $df=118$ ,  $t=-10.53$ ), the results showed the differences are significant and the entrepreneurial capabilities of the students is higher than average.

Table 4 - (H1) compared two groups of students in entrepreneurial capability higher than average and lower than average.

Groups	Number	Average	Deviation of Variance	p	df	t
Lower	10	121	0	0	118	10.53-
Higher	110	151.54	9.13			

To investigate the hypothesis 2, the first year and the last year students divided into two groups and the mean score of groups was calculated by T-Test. The results of T- Test was provided in table -5. With respect to Table 5 and calculating test T ( $p = .923$ ,  $df = 118$ ,  $t = .097$ ), it can be resulted that there is no significant differences between the degree of entrepreneurial capability of first year and last year students.

Table 5. (H2) comparing the entrepreneurial capabilities among first and last year student.

Entrepreneurial capability	Number	Average	SD	T	df	p
The first year	50	150,14	9,95	0950	118	923
The last year	70	149,95	10,41			

In Hypothesis 3 again students were divided into two groups: Students who passed the course and those who have not passed the courses. The average score was calculated for each group and T-test was performed for them. The results are shown in Table 6. According to Table 6 and Calculation of test T ( $p = .544$ ,  $df = 118$ ,  $t = .608$ ) it can be concluded that the entrepreneurial ability of students who have passed the course of entrepreneurship and those who have not passed yet there are not significant differences, and the entrepreneurial ability of two groups are similar.

Table 6 - (Hypothesis 3) Comparing entrepreneurial capabilities among Students who passed the course and those who have not passed.

Entrepreneurial capabilities	Number	Average	SD	p	df	T
Yes	60	150,6	10,83	608.	118	608.
No	60	149,46	9,54			

But in order to examine the relationship between averages and entrepreneurial capabilities of students, subjects were divided into two groups in term of average (84 / 19-91 / 14, 90 / 14-6 / 11). And we compare the divisions. According to Table 7 and Calculating of tests T ( $p = .172$ ,  $df = 118$ ,  $t = -1.37$ ) we can conclude that the student's average does not affect the functionality of entrepreneurship.

Table 7 (Hypothesis 3) comparing the entrepreneurial capabilities of students with Average

Average	Mean	Number	p	df	t	SD
11,6-14.9	148,84	64	172.	118	1,373-	10,14
14,9-1948	151,39	56				10,13

The third part of the third hypothesis is comparing students' entrepreneurial capabilities and their gender, the results shown in Table 8. With regard to the above table and calculating T ( $p = 1.35$ ,  $df = 118$ ,  $t = .18$ ) it can be concluded that there is no significant difference between these the two groups of students.

Table 8- (Hypothesis 3) comparing students 'entrepreneurial capabilities and their gender

Gender	Number	Mean	SD	t	Df	p
Male	60	151,28	9,48	1,35	118	18.
Female	60	148,78	10,76			

For examining the Hypothesis 4 , the students' mean scores were calculated which are shown in Table 9. In order to counterpoint the student's comments, F-test was used. Results were shown in table 10.

Table 9 (H4) Comparing students' entrepreneurial ability in various fields.

Field	Mean	Number	SD
Computer	149,575	40	1,88
Accountant	145,250	40	1,88
P.E	152,175	40	1,88
Total	149,0	120	1,88

Table 10 - Calculation of f- test in term of students' different opinions

The source of distribution	Mean squares	Degrees of freedom	Sum of squares	P	F
Field	489,475	2	978,950	035.	3,43

With regard to this point that  $p= .35$ , it is resulted that there are significant differences in students' opinions from different fields. In order to determine the differences of fields, test-Tukey has been used.

Table 10. Mean comparison in Tukey style. HSD, comparing students opinions from different fields.

Field	Accountant	Computer	Field	P.E
Computer	145,25	149,57	Mean	152,17
Accountant	4,32	----	149,57	-----
P.E	---	----	145,25	-----
Field	6,92	2,60	152,17	-----

With regard of above table we can conclude that physical education students are at higher of level of entrepreneurial capabilities, comparing with other fields.

#### 4. Conclusion

As was noted before, for examining the student's entrepreneurial capabilities, 4 hypotheses were identified and for evaluating validity of each of these hypotheses, T-Test was used. It was observed that the entrepreneurial ability of students is higher than mean. The results also showed that there is no difference among students who have passed the related courses and those who have not passed, and the degree of entrepreneurial capabilities among first year student and the last year ones is the same. The students' average have no effect on the degree of their entrepreneurial capabilities. Finally, it was observed that the degree of P.E students' entrepreneurial capabilities, comparing to students from other fields of study, is in a higher level.

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OFP-008

## Investigating the Relationship between Emotional Intelligence and Entrepreneurship Development (A Case Study: Senior Students of Agriculture, Ilam Branch, Islamic Azad University)

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### Abstract

The aim of the present study was to investigate the relationship between emotional intelligence and entrepreneurship development of senior students of Islamic Azad University of agriculture. According to the aim of this research it is an applied study and based on the nature of the research is correlational. The population of this study is all senior or University master of degree students of agriculture field (N=80). In order to collect data, the Travis Bradbery & Jane Grevs emotional intelligence questionnaire was used (2005). For collecting data of entrepreneurship development a researcher made questionnaire was used. The face and content validity of research instrument were confirmed according to panel, of scientific community for training and promoting agriculture and business management of Ilam Azad University. In order to determine the research instrument pre-test was conducted, that the mean measured Alpha for different parts of questionnaire was 0.82. The collected data was analyzed by spearman and regression correlation coefficient. The results of this study shown that there is a significant relationship between emotional intelligence (self awareness, self management, social awareness and relations' management variables) and entrepreneurship development among senior students of Agriculture University, with % 1 level of confidence. Also, the results of stepwise multiple regression analysis shown that four independent variables of the study specified 92.2 variance of entrepreneurship development variable. In dimensions of emotional intelligence, relations' management variable have the most influence to predict entrepreneurship development variable.

### 1. Introduction

Unemployment of university educated individuals leads to their despairing in the society, following that will decrease the motivation to continue education. If education system grows without attention to economic structures and just focuses on instruction of sciences based on international standards, weakens its role in growing and developing the country. It must be noted that investigating economic role of educational system in general, and high education system in specific, stress on bolstering the relations of this system with economic agencies is not without risk, it encounters with some criticisms, because at least for some of students stress on this issue means a type of conflict with intellect that is in the direction of eliminating scientific freedom, its goal is to limit high education for students and preparing them for job opportunities, since in their opinion high education is just attempt for flourishing students' intellect (Ansari et al., 2007). On the other hand in modern circumstances economic changes have effected on the nature of required skills of work market. In such circumstances because of technologic fast changes and economic evolutions, there is no prediction for work market changes, the necessity for continuous harmony between educational system and work market is visible more than before (Karimi et al, 2013). Today, trouble of high education is that its educated individuals can have efficient knowledge, technology and professional skills in order to create entrepreneurship. According to statistics, nearly 270.000 university educated students enter work market in a year, but capacity of work market is not responsive to this population (Aghdami Bahar, et al., 2011). The existence of harmony between universities' performance and work market needs is one of important issues in high education system. Another problem of high education system related to students is the impossibility of influential assimilating in work market, the lack of symmetry between educational discipline and job activity, more recruitment of graduated persons in non-productive and inactive fields, repelling students and assimilating them in industrial countries (Tavalaei, 2013). According to present statistics the process of employment in agriculture decreases in recent years, while 22.4 of country' occupiers in 1386 were engage in agriculture and forestation in later years this percent decreases to 22.8, 22.4, 20.8 and 20.6 and finally in 1390 have reached to 16.9, this leads to the decrease applicants, desire to employment and entrepreneurship in agriculture section. On one hand enthusiasm and on, the other hand inability, failure and anxiety. So if in respect of emotional self awareness is not strong, he/she can't discover the sources of enthusiasm or inability. As a result the possibility of his/her success is so low. On the other hand, a person who have high level of emotional awareness, by discovering the sources of enthusiasm and analyzing them, uses this factor as a forwarding one, recognizes the sources of anxiety and failure, in order to program to decrease their roles (Kaeif, 2003). Also management or leadership is one of influential factors in the process of entrepreneurship, having the management ability in entrepreneurship activities depends on having high level of emotional intelligence. Those managements who have emotional intelligence are influential leaders. An influential leader is a person who do works with maximum quality and quantity, high performance, satisfaction and commitment to staffs. Leaders give control to the institution, themselves. This feature is rooted in emotional intelligence. Having suitable human relations with others and having social awareness from all things that takes place in society and in the environment in entrepreneurship activities can be a guarantee for continuing of individual's activity. But the problem is that different studies show low score or emotional intelligence among students (Bakhshivand, 2014). Emotional intelligence helps individuals for more awareness, discovery and management, development of ability to recognize social movements in work place and understanding management of relations and improving them. Emotional intelligence is the product of two main skills of social capability and individual capability (Kaeif, 2003). Livarjani et al, 2011 believed that programs of emotional skills education must be used in universities. These programs not only help students for their awareness from emotion states and develop their self- esteem, but also make that they receive high scores in cognition exams. They believed that universities must teach the managing and controlling these emotions and masters must have respectful interaction with students, be a suitable example for promoting this behavior. If there is no attention to this issue in educational system students will not be able to train and live as young's or adults in future. Sometime it was believed that in order to develop agriculture universities and training educated forces will result in agriculture development. So many steps were taken to train skillful human forces. If there is no short come in agriculture educated forces, why agriculture didn't grew and develop as it will be? The fact is that high educated individuals in agriculture, have no scientific and practical skills and capabilities. Naturally this circumstance needs exact and delicate investigation in the field of emerging them (HajiMirrahimi et al., 2009). As the absence of relationship between university and work market is the main problem that high education system is encounter, maybe one of its reasons is those graduated that in on hand have no essential skills in their discipline, on the other hand have no suitable emotional intelligence. Therefore this study is going to answer this crucial question: How is the relationship

between emotional intelligence and developing entrepreneurs' skills? Which of the four dimensions of emotional intelligence can have significant role in developing entrepreneurship among senior Azad University students of Ilam branch?

## 2. Literature Review And Hypotheses

In recent years this concept of intelligence has attracted great attentions in both scientific and applied fields. Chernis believes that although emotional intelligence concept does not used directly, but there is a long lasting history in attempt to develop emotional intelligence, social capabilities and staffs' emotions (Mohammadzadeh, 2013). However it can be say that this is a new concept in history that was introduced in recent years and was used in contrast of cognitive intelligence. Really, this type of intelligence is a non- cognitive one which rooted in social intelligence, the first time was introduced by Thorndik (1920). According to Thorndik, emotional intelligence is humans' crucial ability and management for doing in human relationships in an intellectual manner. He stated that intellectual behavior consists of concrete intelligence (the skill of making and using instruments), abstract intelligence (the ability to use words, numbers and scientific principals) and social intelligence (knowing individuals and the ability to do creatively in human's relationships). So it can say that from historical point of view emotional intelligence is a new concept that was introduced in recent years and was used in contrast to cognitive intelligence. Another theorist that payed attention to different dimentions of intelligence was Veksler. In 1940 he introduced mental (intellectual) and non mental elements. He believed that non mental elements are social, individual and emotional elements. In addition in 1943 he stated that non mental abilities are necessary to predict the possibility of person's success in life (Rakhibi, 2008). Also Veksler in his research refered to attempt to measure non cognitive intelligence (Leeper, 1948). He believed that emotional thought is a part of logical thought that helps intelligence. The most famous one was the concept of between and inner individuals' intelligence (Gardner, 1983) and studies about emotional education, these were the basic for the word emotional intelligence (Akbari ahmmad abadi & Nejad gherani, 2014). Thorndike considered social intelligence as a combination of between individual and inner intelligence. Gardner was one of those who believed that intelligence not only consists of cognitive abilities, but also involves the way of experience and express of emotions. According to Gardner inner individual intelligence consists of person's intellectual abilities for facing him/herself and totally independent of emotions. After Gardner, Salovey & Mayer (2003) were define emotional intelligence as a subgroup of social intelligence that consists of the ability to control self and other emotions and excitements, recognizing self and other emotions and excitements, and using these information for direct thought. In 1990, he introduced the concept of emotional contribution in order that can explain his method to evaluate total intelligence. He believed that emotional intelligence is our ability to compromise with others; it reflects inner feelings (Hafezi et al., 2012). Along with developing the concept of emotional intelligence and its introduction as an ability that has human importance, variety of definitions were presented, we will later refer to some of the most important ones. According to Salovey & Mayer, 2003 emotional intelligence mainly is defined as individual ability to review feeling and excitements of self and others, differentiating the excitements, and using these information in solving problem (Karimi, 2013). According to the point of view of Goleman emotional intelligence includes individuals' ability to accept realities, flexibility, ability to solve problems, ability to master stress. Therefore Goleman stated that emotional intelligence is the ability to preserve motivation, enduring difficulties, postponing failures, sympathy with others. In another definition Golman stated that emotional intelligence is a skill that one who have it can control their spirits through self awareness, develop it through self management, understand it through sympathy, and through relationship management can promote self and other spirit (Kazemi & Arjmandinejad, 2012). In the definition of Baron (1996) of emotional intelligence he stated that it is a set of skills, talents and non cognitive abilities that increases individuals' ability to confront with pressures. According to Baron (1996) emotional intelligence is a type of emotional and social qualifications that determines how well we can compromise with pressures and daily needs and can understand and explain ourselves. Liza Gardner's definition of emotional intelligence is that emotional intelligence is individuals' ability to recognize and express excitements and emotions of self and others (Partonia, 2013). walker (1973) defined emotional intelligence as the ability to understand self and other feelings, the ability to differentiate them in order to direct thought and action walker expressed that emotional intelligence is the intelligence to use feelings and emotions for direct behavior, thoughts, effective relationship with coworkers, administrators, customers, similarly using of time for doing work in order to promote results. Generally it can be say that emotional intelligence is the ability or capability to organize emotions and feelings of self and others, in addition it is to effective control of self and other emotions in relationship with other (Tavalaei, 2013). Generally, the capabilities of emotional intelligence according to the excitement qualifications model of Daniel Goleman is based on four individual and social abilities as follows: Self awareness: The most important and essential ability related to emotional intelligence is that individual be aware of excitements and feelings of themselves. Self awareness ability allow individual to know his/her weaknesses and limitations, be confident to his/her value. Therefore individuals through deep understanding of their feelings, excitements, psychological (mental) states, can achieve exact evaluation of themselves, in other words individual reads his/her emotions and excitements and aware of them (Zivdar & Immani, 2013). Self management: is the ability to control and manage emotions and excitements, the ability to be calm down in critical and stressful situations. In other words self management is the ability to control emotions, excitements and honesty behaviors. Individuals who have self management skills don't allow to show bad behaviors and know where is the origin of these bad behaviors, and how long it will be lasted (Ibid, 2013). Social awareness: recognizing others' thoughts and feelings that includes sympathy in all individual, groups and organizational levels. Those who have this skill know exactly that their speech and action can effect on others, and know that if their behavior is negative they must change it. One example of social awareness is sympathy. Sympathy is the ability to enter others' feelings, to understand staffs' emotions in the process of making intellectual decisions (Agha davood et al, 2012). Relationship managements: the ability related to emotional intelligence, includes making effective communications, grouping work, settling conflicts and making strong bounds between individuals. This skill is used to promote enthusiasm and to remove conflicts. Self awareness and self management skills are related to individual field. Social awareness and relations' management skills are related to the way of individuals' relationships (Janaabadi, 2013). Since there is no formal and definit definition for entrepreneurship but it seems that the word "Entrepreneur" was used for the first time by kantilon, it was believed that entrepreneurs are possessors of their works, but today it is believed that entrepreneurs can employed by companies or organizations, so new definitions of entrepreneurs were presented. Most of intellectuals considered entrepreneurship as a behavior or life style, some considered it as an art work, but Peter Draker considers entrepreneurship as permanent search for change, a reaction to it and utilizing it as an opportunity. On the other hand, Shompiter who is the first one that mention it in his theories considered it as a creative destruction process (Maghsoudi, 2005). Since 1700 B.C. French has used this word for those government contractors that were engage in buiding roads, bridges and ports (Cochran, 1968). Based on disciplines the word entrepreneur for the first time was used by economic scientists, Shompiter considered it a motor of economic growth (Since the role of shompiter in theories related to entrepreneur is so important his title is entrepreneur's father). Entrepreneur, creativity and riskful jobs are mainspring of modern economic those entrepreneurs who are in head of risky works, are looking for opportunities, often creativities are an instrument for their success. They look at this change element as an usual phenomenon, always they are looking for change, and react to it, utilize it as an opportunity. Entrepreneurs replace resources with low utilization by high

utilization resources (Dunphy, 1994). Entrepreneur is a process that takes place in different environments, in changes of economic system through innovations of those individuals who react to economic opportunities makes individual and social values (Echols & Neck, 1998). Stivens et al believed that entrepreneur is a process that opportunities by individuals (for themselves or for an organization in which they work) is followed without attention to sources in their control (Hurley, 1999). Oxford dictionary limits the entrepreneur's field just as commercial tasks that reflects public understanding. So entrepreneur is a person who takes responsibility of loss or profit of an institution or a job, or is a contractor that acts as a mediator (Thompson, 2002). Today intellectuals are agree in social and economic development. Based on three psychologic, social and economic perspectives, presenting a comprehensive theoretical framework for entrepreneurs is so difficult, since economists, psychologists and sociologists tried to enter entrepreneur into specialized fields. After 1980, entrepreneur was attract the attention of management scholars, they tried to enter it into organizational fields (Shafizadeh & Pardakhtchi, 2006). In relation to factors that can develop entrepreneur variety of opinions were proposed, in the following we refers to some. The results of studies show that there is some factors that can affect entrepreneur such as, the state of social foundations, the state of research and development, the state of human sources and management quality. Social foundations: A suitable foundation of a job can be an effective support for commercial activities and makes to develop the main factor of production, human source. Also it can facilitate source distribution and in formation flow and to promote a natural work environment. This increases competition and encourage human forces to work and entrepreneurship. Brundin et al (2008) believe that entrepreneurship activities in a society are relate to some factors such as, marketing opportunity, income making sources, institutional factors (role of government) and cultural factors (Brundin et al., 2008). Geraminegad considered six factors of success in the start of a work that include management teams, customer and market, products, designs, persistence, chance and budget (investment), pointed out that these factors plan four important parts of marketing include, management team, products, marketing and financial providence (Shahbazi, 2011). Now based on the importance of these factors in two dimentions of emotional intelligence and entrepreneurship development, their interfere in a common factor namely generative employment and suffering from unemployment in all society levels such as, university industry, agriculture and servicing sectors variety of studies in Iran and abroad were done (Ahmadpour Dariani, 2003). The results of a study shown that mental picture is the most important predicator of entrepreneurs' behavior. Hadizadeh Moghadam et al (2008) research results shown that there is a strong relationship between emotional intelligence and entrepreneurs' tendencies variables. Kamalian's study results (2012) demonstrated that there is a positive correlational relationship between emotional and entrepreneurs' intelligence. The degree of students' entrepreneurship is very based on their emotional intelligence, the more the students are in a better state of entrepreneurship, their emotional intelligence is high. Shahbazi study results (2011) shown that having risky personality and inner control center have effect on students' entrepreneurship. Tavakoli (2005) concluded that two categories can affect on rural entrepreneurs' success. One category includes motivation and need to development, creativity, inner control center. Another category includes external factors such as achieving financial sources, consulting services, market, and department formalities. Study results of sharifzadeh & Zamani (2006) demonstrated that there was no significant relationship between sophomores', juniors' students, male and female students according to their entrepreneurship spirit. Dein & Anderson (2002) found that there is a positive relationship between emotional intelligence and strategies for solving problems. Also there is a negative relationship between emotional intelligence and negotiation strategies in managing conflicts. Baker (2003) in his research found that dimensions of emotional intelligence has affect on job attitude, staffs, behaviors and their performance.

### 2.1. Reserach Hypothesis

The most important hypotheses of this research are:

- 2.1.1. *There is a relationship between junior students awareness of agriculture university and entrepreneurship development.*
- 2.1.2. *There is a relationship between junior students' self management of agriculture university and entrepreneurship development.*
- 2.1.3. *There is a relationship between social awareness of junior students of agriculture university and entrepreneurship development.*
- 2.1.4. *There is a relationship between relations' management of junior students of agriculture university and entrepreneurship development.*

## 3. Methodology

*Research Goal:* The Main objective of the present study is to investigate the relationship between emotional intelligence and entrepreneurship development among junior Azad University students, Ilam branch, in 1393.

*Sample and Data Collection:* All of the junior students for receiving M.A degree were selected as research sample (N= 80). Since the population of this study is limit, so sampling method was consus one. For collecting data of emotional intelligence Travis Bradbery & Jane Graves' questionnaire in four dimensions was used (2005) self awareness (5 variable) self management (9 variables), social awareness (7 variables) and relations' management, for scoring five Likert scale was used (the least =1, the most = 5). In entrepreneurship development a research made questionnaire was used. It comprises of two parts: statistical demographic features (4 variables) and measuring variables of entrepreneurship development (strategies for entrepreneurship development with 25 variables, 25 variables of entrepreneurs' characteristics, 30 variables of entrepreneurship motivation 30 variables of entrepreneurs' training, 30 variables of entrepreneurship support) were used. Face and content validity of research instrument was proved so that many studies through books, articles and thesis have done. The used important concepts and variables in this research were specified. After designing questionnaire's items some drafts were handed to masters and intellectuals of agriculture training and commercial management of Islamic Azad University, according to their opinions some modifications have done. To determine research stability of research instrument a pre-test has done that is the measured mean alpha for different parts of questionnaire was 0.82.

*Analyses and Results:* For data processing, analysis and describing them descriptive and analytical statistics were used as follow. In descriptive statistics central and dispersion parameters were used. In analysis statistics and in order to test hypotheses spearman's correlation coefficient was used. Also in order to measure collective role of independent variables in specifying dependent variable multiple regression in a step by step manner was used.

## 4. Result and Discussion

### 4.1. Correlation Studies

In this study in order to investigate the relationship between four dimensions of emotional intelligence (self awareness, relations' management, self management and social awareness) and entrepreneurship development variable spearman's correlation coefficient was used. The results of measuring correlation coefficient were mentioned in table (1). According to the table statistics, there is a significant relationship between self awareness variable

and entrepreneurship variable with 0.99 confidence ( $\rho = 0.69, p < 0.01$ ). The table results show that there is a significant relationship between self management and entrepreneurship variables with 0.99 confidence ( $\rho = 0.59, p < 0.01$ ). There is a significant relationship between two variables of social awareness and entrepreneurship development with 0.99 confidence ( $\rho = 0.48, p < 0.01$ ). Also, the obtained results of this table show that there is a significant relationship between relations' management and entrepreneurship development with 0.99 confidence ( $\rho = 0.649, p < 0.01$ ).

Table 1. Investigating the relationship between research variables and entrepreneurship development variable

Hypothesis	First variable	Second variable	$\rho$	P value	Result
There is a relationship between students' self awareness and entrepreneurship development	Self awareness	entrepreneurship	0.691	0.000	H1 Accepted
There is a relationship between students' self management and entrepreneurship development	Self management	entrepreneurship	0.596	0.000	H1 Accepted
There is a relationship between students' social awareness and entrepreneurship development	Social awareness	entrepreneurship	0.489	0.000	H1 Accepted
There is a relationship between students' management of relations and entrepreneurship development	Relations' management	entrepreneurship	0.642	0.000	H1 Accepted

#### 4.2. Multiple Regression Analysis

In this study in order to measure collective effect of independent variables on determining dependent variable variance (entrepreneurship development) multiple regression analysis with step by step method was used. As in this study the amount of Dorbin- Watson (DW) is 1.868, between 1.5 and 2.5, it can be conclude that there is no correlation between errors (the difference between real and predicted value by regression equation) so it can be used regression. In this research for determining regression equation, the value of entrepreneurship development (Y) as dependent variable and significant predicting variables (self awareness, self management, social awareness and relation management) multiple regression analysis with step by step method was used. in table (2) in addition to entered variables in each step, the relationship between independent and dependent variables in each step was shown by multiple correlation coefficient (R). As it is evident in table (2) from first to second step multiple correlation coefficient and determination coefficient increased, in the second step it reached to maximum, so that in the last step the degree of this relationship between independent and dependent variables was 0.960. In table (3) Beta value shows the relative importance of independent variables in determining dependent variable. Based on obtained standard Beta value variables of self awareness ( $\rho = 0.000, t = 10.149, \beta = 0.367$ ), relations' management ( $\rho = 0.000, t = 17.563, \beta = 0.600$ ), self management ( $\rho = 0.000, t = 16.254, \beta = 0.194$ ) and social awareness ( $\rho = 0.000, t = 15.350, \beta = 0.552$ ) were as important variables, respectively, that have the most effect on the degree of changes of dependent variable. Therefore these variables remained in the final model, the results of this investigation show that these predictive variables can determine %92.2 of dependent variable changes ( $R^2 = 0.922$  determination coefficient).

$$Y = \text{Constant} + a(x_1) + b(x_2) + c(x_3) + d(x_4)$$

Y = Entrepreneurship development value

$x_1, x_2, x_3$  = Variables' equations

a, b, c, d = Coefficients of equation variable

Constant = Constant number

$$Y = 9.425 + 1.233 x_1 + 2.02 x_2 + 2.230 x_3 + 2.415 x_4$$

Table 2. Coefficients and multiple regression significant level

Step	Variable	R	R <sup>2</sup>	R <sup>2</sup> Adj	Measured F
1	Self awareness	0.699	0.489	0.482	74.653**
2	Relations' management	0.825	0.681	0.637	82.317**
	Self management	0.860	0.823	0.818	121.853**
	Social awareness	0.930	0.922	0.919	300.648**

Significant level: \* :  $p \leq 0.05$

\*\* :  $p \leq 0.01$

Table 3. Results of the final model of multiple regression analysis to determine degree of entrepreneurship development according to the most important predictive variables of the research

Predictive variables	Non-standard coefficients			Measured	Significant level
	Input coefficient	Standard error	Beta		
Constant number (ordinate from matrix)	9.425	2.930	-	3.127**	0.002
Self awareness ( $x_1$ )	1.233	0.121	0.367	10.149**	0.000
Relations' management ( $x_2$ )	2.020	0.115	0.600	17.563**	0.000
Self management ( $x_3$ )	2.230	0.128	0.194	16.254**	0.000
Social awareness ( $x_4$ )	2.415	0.157	0.552	15.350**	0.000

Significant level: \* :  $p \leq 0.05$

\*\* :  $p \leq 0.01$

### 5. Conclusion

Today, science has discovered the influence and power of human mental emotions and excitements, it is going to discover and determine the place of excitements and feelings in human activities, maners and personalities. In the field of intelligence studies the flow of research is moving from intellectual intelligence (that is based on cognition) towards emotional intelligence. Emotional intelligence tries to describe and explain the place of feelings and excitements in human capabilities (Mokhtaripour, 2006). Most of writers have wrote about potential abilities of emotional intelligence and its effect on usual and routine life of human, however these discussions made that an old belief faced with challenge, a belief that knows the nature of human is in continuous contrast between Hearn and brain, there exists an ambiguity about its correctness. In addition it made that people believed that emotional intelligence can increase individual's health, welfare, public ease, wealth, success, love and happy. So emotional intelligence in a key for success and effectiveness in most of team and organizational affairs like more effective management, creating entrepreneurship spirit and increasing work motivations. But since the discussions about emotional intelligence are novel, it is necessary to exact and scientific evaluations about these claims so that specify their accuracy or inaccuracy (Rakhibi, 2008). The aim of this research was to study the relationship between emotional intelligence and entrepreneurship development among Islamic Azad junior university students of agriculture. The findings of research first hypothesis by spearman correlation coefficient shown that there is a positive and significant relationship between self awareness and entrepreneurship development of junior agriculture students of Islamic Azad University of Ilam branch. Entrepreneur encounters with many emotional conflicts in the process of entrepreneurship. In one hand enthusiasm, on the other hand anxiety and failure. If an individual is not strong in relation to self awareness, he/she can't identify enthusiasm or failure sources, as a result the possibility of his/her success is very low. On the other hand a person who has a high level of emotional self awareness, by identifying enthusiasm sources, analyzing its factors, employs it as a forward force, and by identifying anxiety sources he/she can decrease its role (Karami et al., 2006). According to the above mentioned materials it is evident that one of the crucial characteristics of a successful entrepreneurship is self awareness. The obtained results shown that all of students have high level of awareness than medium, it means that all of them have reached to a high level of self awareness and they are aware of their emotions, feelings and mental changes. It can be said that M.A students have reached to required self awareness because of high level of education, age and more experience. They have no problem related to self awareness in order to be successful entrepreneurs. The research results are along with Maghsoudi (2005) study and Hadizadeh, Moghadam et al (2008) study.

Findings of second research hypothesis shown that there is a positive and significant relationship between self management variables and entrepreneurship development with 0.99 confidence levels. These results are totally in accordance with Kamalian (2012) study and Brundin et al (2008) study.

The findings of third research hypothesis revealed that there is a significant and positive relationship between self management and entrepreneurship development with 0.99 confidence level. The results are in accordance with shahbazi (2011), Jamshidifar et al (2011). The findings of third hypothesis by spearman correlation coefficient revealed that there is a significant relationship between entrepreneurship development and relations' management among junior students of agriculture university. The conducted studies in thousands organizations shown that nearly two third of capabilities with high performance consisted of social characteristics (Karami et al, 2006). The present study has proved it and revealed that successful entrepreneurs in respect to social skills' have better position than others. Effective social relations of successful entrepreneurs lead to their activity convert to considered results. These results are in accordance with Swierczek & Thai (2003), Sharifzadeh & Zamani (2006) studies. Since emotional intelligence is acquired, it can be promised that by training and promoting emotional intelligence one can promote and increase entrepreneurship level. specially, in our country



unemployment is one of crucial problems of the society, it must pay more attention to it, and to increase individuals' emotional intelligence by suitable teachings. Any way it seems that in order to create more successful entrepreneurship in society, must promote individuals' emotional intelligence. The results of this study shown that there is a direct and positive relationship between entrepreneurship and emotional intelligence, if students are in a better state of entrepreneurship, they have high emotional intelligence. Thus the results of this study are in accordance with some conducted research in this field such as: Maghsoudi (2005), Hadizadeh Moghadam et al (2008), Rhee (2007), Brundin et al (2008) and Zampetakis (2009).

Also the results of multiple regression analysis with step by step method revealed that four independent research variables could specify 92.2 variance of entrepreneurship development among junior students of agriculture university of Ilam branch. Among dimensions of emotional intelligence, relations' management variable has the most effect on entrepreneurship development variable.

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**Entrepreneurship Approach and Incentives Given in Turkey, United States and Europe**Faik Çelik<sup>a</sup> Ayfer Özmen<sup>b</sup><sup>a</sup>*Kocaeli University, Faculty of Economics and Administrative Sciences/Kocaeli-41380/Turkey*<sup>b</sup>*Kocaeli University, Hereke Ö. Uzunyol Vocational High School/Kocaeli-41800/Turkey***Abstract**

In this study, the issue of financing of entrepreneurship is discussed. While the issue is examined, Turkey and U.S. are reviewed separately and their differences are tried to be highlighted within here. Also, the financing for entrepreneurship is overemphasized in three different practices. In addition to financing of entrepreneurship, the importance of incentives to be given and other supports are urged upon as well. The countries provide financial assistance to small and medium-sized enterprises (SMEs) in different forms. They are available in different forms such as grants, loans and, in some cases, guarantees. Support is available either directly or through managed at national level. SMEs can also benefit from a series of non-financial assistance measures in the form of programmes and business support services. In this study are examined Turkey, Europe and United States of America.

**1. Introduction**

Financing is one of the most important requirements of SMEs in the continuation of their assets with creativity and growth. The matter of resource is the biggest issues SMEs face in protecting their market shares and entering into foreign markets. In a great number of countries, SMEs use two main financing courses in the breaking free of their resource expenses: choosing borrowing and/or increasing their capital investment. In general, SMEs face problems in respect of benefiting from different financing alternatives and establishing balance between different financing courses. The public authorities have an important role in drawing the frame for the development of newly formed and small scale companies, and financing courses to be provided in the assurance of their seed capital.

*Material and Finding(s):* In this study, literature review is performed in relation to each three regional areas.

**2. Literature Review And Hypotheses***2.1. Where do SMEs obtain financing from which resources in United States of America?*

In consequence of the United States of America being one of the supporters of free economy policy, it is not possible to bring forward that the industry of the country is supported through the means of incentives. However, when it is observed the decisions and practices of various public institutions and organizations on the basis of both federal and state level, it is determined that there are existing measures becoming evident directly or indirectly in the form of protection in U.S. especially.

*2.1.1. Why is financing is important for your business?*

Some entrepreneurs only imagine starting their own business; others however try to realize these dreams. When you make up your mind to show efforts in the direction of realizing these dreams, finding out how to start or improve this business and eliciting where from and how the funding will be provided may become complicated, scary and seem as a loss of time. According to the type of business, the amount of financing to be provided may be as little as 100 dollars or as much as 1 billion dollars. Within the guide prepared by the American Small Business Administration; the topic is taken at hand with its various aspects such as below. (SBA-U.S.-Small Business Administration-2014)

*2.1.2. Who can obtain financing to be able to start or improve a business? How much money will you need? Does the business you own do production or provide services? Will labor force be employed? Did you invest capital when starting up your own business?*

The entrepreneur may obtain financing. Any business which is valid may be funded if you know where to look. If the business succeeds, each member who has a share in the business will make profit. A business creates new employment and brings in a new product or service.

Even though each business is different, you may be able to have a sound opinion regarding 'how much financial support does your business need?' by taking into consideration some key factors. Since the costs of raw material, instrument and equipment of the businesses which operate in service sector will be small, they will require lesser financial support. In the beginning, in case the business owner will use his/her own labor, the costs will be lowered. However, as the business makes progress, it will be necessary to employ personnel to carry out daily tasks. All of the business owners will prefer for you to put your own capital while joining a business. Persons becoming partners of the business with their own capital without borrowing funds or credit is called equity. However, it is necessary to put capital in the business as minimum as a ratio of 25%.

*2.1.4. Types of Funding**2.1.4.1. Borrowing or investing capital?*

While deciding in which way the entrepreneurship will be financed, it is necessary to find answers to the questions of: - How much of the new business can be controlled easily? - In which factors the persons to obtain financing through borrowing or putting capital are interested in concerning the business?, - With what interest ratio the company is being credited?, or - How much of a governmental support is requested?. (Accordingly, that much of a high financing may be requested in relation to the amount of seed capital.) (U.S. Small Business,(2015) www.sba.gov.)

*2.1.4.2. Financing by means of borrowing*

Generally, the amount of interest paid is more than the money borrowed. Thus, it is necessary to take into consideration of the interest rate to be charged.

*2.1.4.3. Interest Rate and Risk. Which conditions do lenders stipulate? The advantages of financing through borrowing. Disadvantages of financing through borrowing financing by Investing Capital*

The interest rate shows the level of risk the investor undertakes while giving you borrowed money. If the investor does not feel that he/she is under risk, requests for a lesser interest. As the risk increases, the interest increases accordingly. As the solvency increases, the interest falls down.

By assessing the answers given to these questions, the lending party will carry out evaluations: With regard to ability of repayment, will there be collateral provided such as a profit intended for an existing business or profit made intended to a new business?

The financing through borrowing ensures for the entrepreneurship not to lose the company control. In this way, he/she does not need to share the profit and holding in hand the decision making mechanism is retained. In the method of borrowing, after the borrowed money is paid, the person who is lending will not hold any kind of receivable on and/or from your business. (U.S. Small Business,(2015) [www.sba.gov](http://www.sba.gov).) The biggest disadvantage of financing through borrowing is the necessity of making payments in certain amounts each month. (Arthur Andersen & Co.Sc. Eurotax IV(1993))

In this way, it is a matter of obtaining financing by selling some part of entrepreneur shares in business. The person who becomes a partner of the capital becomes a business partner and has a voice in both the administration of the company and in his/her own share ratio also. For example, equity financing which is a type of financing by investing capital works like this:1) By the analysis you make, you have to determine whether the business needs much more pecuniary resource which is more than which is already existing; 2) By taking into consideration of financing options, you need to prefer selling your shares instead of borrowing;3) You organize a group of equity financing offer.

*2.1.5. Various Financing Resources*

*2.1.5.1. Private Resources*

By regulations to be made by financing from private resources, or loans received from private persons, partnering to capital from personal resources and becoming a partner to the capital by both loans and capital may be compensated from legal resources.

*2.1.5.1.1. Savings*

Personal resources are a type of resource which is used the most for a new business. Lending persons stipulate the condition of an important part of your own resources to be turned into investment in your own business. As the business owner, when the entrepreneur procures a certain part of your financing from your own savings, this will be a situation in his/her own favor.

*2.1.5.1.2. Immediate Surroundings*

Ensuring resources from known persons instead of unknown persons may provide flexibility in payment reimbursement periods. When resources are obtained from close vicinity; it will be into the entrepreneurs' favor to guarantee this under a written agreement and make it formal. (U.S. Small Business,(2015) [www.sba.gov](http://www.sba.gov) Loans, Grants)

*2.1.5.2. Financing through borrowing*

*2.1.5.2.1. Banks*

It is important to know what banks belong to which categories. Saving banks are experienced in respect of consumer loans such as house or vehicle loans. Commercial banks are more experienced in business loans. You need to be careful about such applied banks which are specialized in which topic and if they are experienced. The first responsibility of the banks is to protect the depositors. In this way, they play it safe while lending.

*2.1.5.2.2. Credit Institutions/ Consumer Financing Companies/ Commercial Financing Companies. Business Loan/ Insurance Companies/ Factoring Companies/ Leasing Companies*

American credit institutions are financial institutions which have been developed by company employees, unions or other groups. Credit institutions are regulated by the National Credit Union Administration (NCUA). The advantages of credit institutions may be listed as such:

Even an entrepreneur who is working dependently under a large company may receive loans to set up his/her business from these organizations. The interest rates of credit institutions are lower in relation to others. The credit amount may not be high; however it will be beneficial as starting capital especially. Moreover, the probability of the acceptance of your credit request application is much higher.

These companies give personal loans in small amounts depending on collateral (debt). In contrary to banks, they do not accept deposits and give out loans on the basis of authorization given to credit regulations done according to small businesses of each state. Consumer financing companies finance the entire of the amount needed in case the loan is secured by a capitalized security. These companies correspond with much higher interest rates and commission charges from banks and credit agencies but may be more flexible in the evaluation of the requests. The consumer financing companies are preferred by persons who have a much lesser credit score.

The main purpose of a commercial financing company is to provide loans for the investments and financing of machinery and equipment necessary for the investment. The commercial financing companies show similarity to consumer financing companies but they give business loans other than consumer loans. ([www.sba.gov](http://www.sba.gov).tr (2015)<https://www.sba.gov/content/what-sba-offers-help-small-businesses-grow>)

A seller ensures for the buying of an asset which he/she has sold and requests for the disbursement of the payment immediately. If the seller accepts for you not to make the payment instantly, this is accepted as a commercial or trader loan. . (U.S. Small Business,(2015) [www.sba.gov](http://www.sba.gov) Loans, Grants)

The sellers give out this loan to make their goods more attractive or with the purpose of inducement. In this way, the seller is included within your business to take a share from the profit. The flexible loan payments may be financed invisibly such as the goods which are being reflected to the consumer with a much higher price.

Generally, the insurance companies grant term loans or mortgage loans At the end of the financial leasing agreement, the right of ownership of these assets may be acquired in return for a certain amount. Excluding this mentioned method, there are ways existing which most of them haven't found field of practice in our country. These are; "*lease with purchase option*" – the method where the right to buy assets is given to the leasing person at the end of the lease duration, "*credit bail*" – the method where sale value is shared in case the asset is sold by the leasing person at the end of lease duration, "*sale and lease back*" – the method where leased asset is leased following being sold to the leasing company, "*sales aid lease*" – leasing which aids the sale, "*leveraged lease*" – the method to find funding to the leasing person from another financing organization for the buying of the asset, "*swap lease*" or "*upgrade lease*" – the method where the leased asset is exchanged at the end of the leasing duration, "*plant lease*" – is a type of leasing of a facility,"blanket lease" – wide-ranging leasing containing various alternatives, "*trial period lease*" – leasing with a trial period, "*joint venture lease*" – is a type of leasing where there are more than one leasing persons,

### 2.1.5.3. Financing by Capital

#### 2.1.5.3.1. Venture Capital Firms

Primarily, Venture Capital may be a way of investment in businesses which haven't proven themselves. The venture capital firms provide a start-up capital to companies which have just been formed. This difference is the major difference which separates the venture capital firms and investment companies. The venture capital firms do not give out cash loans. Instead, they provide the same advantages and disadvantages to companies as it is in financing by sharing the holder's capital.

#### 2.1.5.3.2. Closed End Investment Companies

A closed end investment company is similar to a venture capital company. But, they have a much lesser amount of money to invest. Other than some exceptions, the Closed End Investment Companies prefer more to make investments to companies which have proven themselves.

#### 2.1.5.3.3. United Investment Resources

The united capital companies show activity similar to the traditional venture capital firms. The organization invests in your business through buying stocks. By this way, the entrepreneur is brought together with the investing organization. The organization makes profit by entering into new markets; so the business owner makes profit with additional capital. In addition to these, uniting your business with a united capital resource will increase the credibility when looking for funds. The specializations of this organization are marketing, manufacturing, research and development, etc. The united investment to your business may be in these 4 ways:

— *Complete Financing*: An outside organization buys the entire of your business and you lose all your rights and control you have over your business. — *Partial Financing*: An outside organization finances some part of your shares you have in your business. — *Subsidiary*: A partnership is established between you and an outside organization where the business you run provides consultancy with capital. — *License Agreement*: As a business owner you hold the control of your business; but you obtain cash in the ratio of business done according to the agreement.

#### 2.1.5.3.4. Investment Clubs/ Employee Stock Ownership Plan (ESOP)/ Private Investment Partnerships

In many countries, the businessmen groups form more regional organizations to make investments to new or established businesses. These clubs have a lesser formality than professional organizations. The private investors determine resources to make a business investment. Because the group invests together, in case the small investors take action independently, they may make the funds which are hard and impossible to collect useful for your business. If the entrepreneur is employing personnel in the business, it may be possible to directly sell capital shares to these personnel. Private limited partnerships with 35 or lesser members do not need to be registered with the "Actives and Exchange Commission". A typical investment requires a capital of \$20,000 or less per partner. The royal partners are responsible of taking a look at the works and making decisions. The partners who are limited and not active provide you funding and expect to gain an adequate profit from the investment. Only, the profit they will gain may be lesser than what a venture capital company may provide. . (U.S. Small Business,(2015) www.sba.gov. Loans, Grants)

#### 2.1.5.4. Consolidation of Financing through becoming partner to the capital by financing through borrowing

The customers as a resource of funding: the potential financiers of your company in some industries, may recommend giving you funding both after you start your business and during the development of it..

#### 2.1.5.5. Resources of State /Small Business Administration (SBA)

In addition to private resources which we discuss, there are possibilities of different government supports. A government agency may be related to new works which will have an affect upon the agency or customer groups which it serves.

Generally, SBA guarantees the part up to \$500,000 which will constitute the 70% to 90% of the loan value with the verge of not exceeding 2.75% being higher than the main lending ratio. The SBA from time to time will try new types of credits and services. Persons need to contact regional SBA offices with the purpose of finding out what kind of credit programmes exist in the sector which they are in. . ( www.sba.gov 2015)

## 3- Financing and Incentive Measures of SMEs in European Union

### 3.1- Support Policies Orienting SMEs in European Union

The industry policies which EU applies may divide into these three main groups such as below;

1. The development of modern industry branches based upon high technology and which have high employment abilities,
2. The support, protection and development of traditional industry sectors,
3. Giving support to SMEs.

As it is observed here, the support to SMEs forms the third main factor of the industry policy of EU.

The EU has drawn its SME perspective related to the duration of 1997-2000 with the "Integration Programme 1996". Within the framework of the policies taken at hand by the EU within the framework of "Integration Programme 1996", the support programmes it executes may be listed as below;

- Financing programmes (start up capital, Eurotech capital),
- Market accessibility programmes (information for public biddings and Euro-marketing),
- Education and consultancy programmes (Euro-management, business and innovation centers),
- Environment programme,
- Cross border cooperation programmes among businesses (Interprise, oropartenariat, BC-Net, subcontracting and business approximation office),
- Incentive movements orienting regional policies,
- SME information programme and programmes orienting the development of human resources in SMEs.

The technology accessibility, technology transfer and technology development programmes. These may be counted among these programmes which aim to develop the competition power of SMEs by conveying them to the technological developments easily.

1- Euro-management (R&D Supervisions).2- Value (SME biddings). 3- Sprint (Innovative practices and technology transfer).

4- Mint (Management of Integration of New Technologies).5- TII (Technological Innovation Information Unit).

6- Craft (Cooperation in Technological Researches).7- Value (Popularization and Usage of R&D results).

8- Telematique (New telematique systems and development of services in areas such as telecommuting and providing broad service).9- Race (The ensuring of the development of advanced communication systems to contribute to the economical development and social union by taking into consideration of probability of fast progresses in technology, legislative amendments and Trans-European networks and services.

10- Esprit (Research and technology development movements, especially the formation of the information substructure which the information society needs).( EU-2004)

### 3.2. Financing Programmes

#### 3.2.1. Initial / Seed Capital/ Eurotech Capital

##### a) Purpose b) Action

It is aimed to increase the chances of survival of new businesses by the encouraging of the establishment of businesses in the European Union and providing equity capital to the innovative SMEs which may end with starting a new business and show progress plans and innovations. With the initiative of the commission, 24 starting capital funds have been created. SMEs take advantage of advances which compensate 50% of the business costs for the duration of five years and which are need to be paid back. *Eurotech Capital:*a) Purpose b) Action c) Resources

The aiming to target the venture capital for high technology SMEs, and encouraging of the investment to be made by European venture capital companies to businesses which develop cross border high technology projects. The encouraging of financing of cross border high technology projects. A network formed by 13 existing European venture capital companies. These companies undertake to make an investment in the amount of nearly 190 million ECUs in cross border high technology projects.

### 3.3. Fourth Framework Programme for Technological Development with Scientific and Technical Research

#### a) General Information b) Fourth Framework Programme and Special Programmes orienting SMEs

The Fourth Framework Programme is formed of four sections: Research and technology development and demonstration projects; The encouragement of cooperation with countries which are not members of EU and international organizations; The popularization and evaluation of the results; The encouragements for the education and mobility of the researchers.

The commission aims to carry out the necessary regulations for the SMEs to join EU researches or benefit from the results in a more effective way and this has a priority of the R&D investments of the EU to be brought to a commercial offer status. ( EU-2004)

#### 3.3.1. EUREKA

The commission makes contributions to the financing of some EUREKA projects. One of the most important of these is the HDTV (high definition television for European standards) and JESSI (the improvement of 64 MB memories and its applications) projects. Within the context of the Fourth Framework Programme, the cooperation between the R&D operations of EU and EUREKA has been increased within the scope of operations which are being carried out.

#### 3.3.2. COST

Within the context of COST (European Cooperation of Scientific and Technical Research) which has been implemented since 1971; 15 member countries, EFTA, Turkey and old...?

#### 3.3.3 Information and Communication Technologies / Telematique Programme (Telematique System Projects)

##### a) Goals b) Technical context

By the way of improvement of new telematique systems and services in areas such as remote tasks and remote service; the enhancement of the encouragement of competition strength of European industry and employment; The encouragement of research policies which are necessary for other mutual policies; Concentrating on new telematique multi-media which includes the entire distributed and interactive multi-media applications, Attaching much more importance to the needs of users, Elaborating finding solutions to payable costs. TELEMATIQUE programme supports ATG activities in three topics consisting a range of primary projects. Moreover, below horizontal precautions are emphasized.

#### 3.4.5. Transportation

The works in this area foresees the widening of by means of containing the sustainability and consolidation of telematique researches (DRIVE) realized in the area of highway transportation in the Third Framework Programme and other transportation types of ATG works (air, sea, river, lake and railroad transportation and multi-mode transportation).

#### 3.4.6. ESPRIT: Information Technologies Programme

The ATG activities which are carried out within the context of this programme are envisaged to be related to information substructure being formed and to form the nervous system of the information society in the future.

#### 3.4.7 Industry and Material Technologies -Brite-Euram (Industry and Material Technologies)

##### A) Goals (Fourth Framework Programme)

In short term, the development of new industry technologies to create a leverage affect on the competition strength of sectors which have low technology level especially or prioritization of researches in relation to the adaptation of existing technologies along with these being related to SMEs in sectors which forms a great part of the European industry and provide the great part of employment. (Third Round -2000)

### 4. Institutions and Organizations which support SMEs and Support Programmes in Turkey

Being the protector of tradesmen, craftsmen and SMEs, Halk Bank of Turkey has succeeded to widen in late years of the credit practices suitable for SMEs which it started in 1996. For example, Halk Bank of Turkey has given loans to nearly 1 million businessmen within the years of 1996, 1997 and 1998.

#### 4.1. Institutions and Organization which provide Financial Facility

Ministry of Industry and Trade, Small Industry and Craftwork General Directorate, Halk Bank of Turkey, Industry Development Bank of Turkey, Venture Support Agency, Craftsman's Cooperative, Small Industry Cooperatives, Small Industry, Industrial Zone and Complex General Directorate, World Bank Credits, (İnceci B.-2013)

#### 4.2. Institutions and Organizations which give service of Technical Support and Consultancy

It is introduced hereby the principal institutions and organizations which give service of technical support and consultancy to SMEs in Turkey.

##### 4.2.1. Halk Bank of Turkey

The services of technical support and consultancy given to SMEs by Halk Bank of Turkey can be listed below such as: To give assistance to the organization of tradesmen and craftsmen in the form of cooperatives. To carry out tasks with the purpose of the marketing of the products of craftsmen and small scale companies. To take care of the education issues of tradesmen and small industrialists, to carry out works to increase their occupational

manners and information.

#### 4.2.2. Small Industry Development Organization (KÜSGET)

It has been established in 1983 with the purposes of creating employment, increasing efficiency, to mobilize capital and occupational abilities, organize educational programmes, increasing entrepreneurship, reconstructing underdeveloped regions, making contributions to creation of income and turn small industry companies into units which will be sub-industries to large scale industry and shows activity as a general directorate under the structure of Ministry of Industry and Trade.

#### 4.2.3. Republic of Turkey Small and Medium Enterprises Development Organization (KOSGEB)

KOSGEB has been found by Grand National Assembly of Turkey in accordance with 3524 numbered law passed in April 12 1990 with the purposes to increase the share and efficiency of SMEs in the fulfillment of the economical and social needs of the country, to increase the competition strengths and levels, to realize the integration in industry suitably with the economical developments. (KOSGEB -2001)

#### 4.2.4. Ministry of Industry and Trade, Small Industry and Craftwork General Directorate

Its main purpose is to accommodate, support and regulate the proceedings of SMEs within the frame of the regulations and to help the formations of small craftworks cooperatives.

#### 4.2.5. National Productivity Center (MPM) Chambers of Trade and Industry, Venture Support Agency (TDA)/ Foundation of Small and Medium Sized Enterprises, Self Employed and Executive Businessmen of Turkey (TOSYÖV)

The National Productivity Center (MPM) established with the 580 numbered law, has been charged with researching for precautions to help out the improvement of homeland economy in accordance with the principals of efficiency, to carry out tasks to provide these precautions to be put into practice, find methods to increase efficiency in both governmental and private sector businesses, and to research for the possibilities of implementation of these, and to measure National Productivity. The head office offers consultancy, educational and technical information services to businesses.

### Conclusion

The integration of Turkey into European Union does not bring important limitations to the incentive of industrial investments. Turkey, with regard to regional differential measures will be able to provide the governmental supports it already implies to the industrial investors in the future also. However, it will not be possible to give governmental supports with the reason that it will create competition differences in exports to be done to member countries of the union. The advantages of SMEs in terms of its contribution to the process of industrialization are such as: – They easily show accordance with the conditions of market economy. – They resist the economical fluctuations much easier with the reason of their flexible structures. – They may be established with low seed capital. – Show easy adaptation to technological innovations. Sub-enhanced suggestions to provide for the small and medium sized businesses in Turkey to compete in customer union requirements have been summarized below: \* The share of SMEs in the total credit volume must be increased. \* With the purpose of getting rid of the financing issues of SMEs; it should be ensured of the formation of a private SME bank or bringing the Halk Bank of Turkey into force in this direction

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## OFP-010

## Investigating the Effects of Psychological and Socio-Cultural Factors on the Tendency of Villagers to Use E-Banking Services (Case Study: Agricultural Bank Branches, Ilam, Iran)

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### Abstract

The main objective of this study was to investigate psychological and socio-cultural factors effective on the tendency of the villagers to use e-banking services. The current paper is an applied study considering its objectives. The main data gathering tool in the current study is a made questionnaire which is designed and executed based on the conceptual background of the subject matter and the objectives and hypotheses of the study. The statistical population of this study includes all the customers of rural branches of Agricultural Bank in Ilam Province (N=82885). Among these 120 participants were chosen through sample size determination formula and they were studied using stratified random sampling method. In the analytical statistics level the results obtained from calculating Spearman's Correlative Coefficient showed that socio-cultural and psychological factors had a significant impact of the extent of the tendency of the villagers to use e-banking services of the Agricultural Bank at the 99% level. Furthermore stepwise multiple regression analysis showed that both sets of psychological factors as well as socio-economic factors were able to explain 50 percent of the variance of the independent variable; namely the tendency of villagers to use e-banking services.

### 1. Introduction

Significant developments in the field of information and communication technology (ICT) in the last decades has revolutionized all the aspects of human life and in today's world new concepts such as electronic government, e-commerce, e-banking, electronic insurance and electronic education gained attention. The most affected aspect of all is the trading sector and in turn the banking industry has seen staggering alterations. The majority of traditional banking activities are forgotten and instead e-banking has gained popularity, and this sector has turned into an information processing industry which based its activities on new concepts such as e-money, ATMs and so on (Gudarzi and Zobaidi, 2008). This leads to a situation where there is ample space for carrying out trading affairs and buying and selling processes which in turn leads to increasing competition among different banks and renders them facing several threats and barriers. In order to overcome these barriers and make use of the potential opportunities of the market, the banks should focus their assets on acquiring a competitive advantage. Several researches showed that banks can significantly upsurge their profitability by increasing their loyal customers as well as the satisfaction of those customers (Kolodimsky et al, 2004). Accepting electronic and online banking is gaining popularity in many countries in a way that the e-banking connection ratings in pioneer countries has extended to more than 50 percent (Teropik Karainext et al, 2004). Revolutions in e-banking and its increasing popularity and expansion is generally due to factors such as time independency, location independency, the high speed of transactions, low costs, simultaneous access to several banks and high quality of information (Hamidzadeh et al, 2007). In this regard the increasing attention of the banks in developed as well as developing countries to providing banking services through e-banking aimed at facilitating services for customers and reducing banking costs has created a stiff competition in e-banking industry which has forced the majority of banks to implement modern information and communication technologies (Bayat, 2008). Regarding the fact that villages and village residents are prominent features of civilization and social, economic and cultural life of any country, and their role and status they have been always a subject of attention for policy makers, managers and planners. Village as the basic unit of production and the social life of any nation affects other elements of the society and is affected by them too. The significant share of the villages in the country's population, a grave gap in accessing facilities and services, the necessity of pursuing social justice and creating balance between the cities and villages are all among the important issues that should be considered the development planning (Emadi and Darban Astaneh, 2004). However as mentioned before it seems that the e-banking industry haven't had a proper growth in Iran and it haven't been able to service all sectors of the society despite its great potential (Amadeh and Jafar Pour, 2009). Based on the census of the central bank of Iran more than 7 billion and 110 million bills are used in Iran which gives Iran the first place in the world. On the other hand the average life span of each bill is 5.3 years and in order to timely eliminate them each year 1 billion and 400 million bills should be eliminated and currently there is a capability of producing only 700 million bills (Amadeh and Jafar Pour qu. Ebrahimi, 2009). Also annually about 700 million utility bills are delivered to the households in Iran which exerts very grave financial and time costs (Shahbazi, 2008). Establishing e-banking not only leads improvement in service quality but also reduces 60 to 70 percent of banking costs. Also it can revolutionize all aspects of banking industry by quick contact with the customers and delivering services based on peer to peer need satisfaction. Regarding the fact that the national banking system realizes the importance of using electronic tools and on the other hand the lack of delivering timely banking services to all sections of the society is considered a massive barrier facing the economic development and expansion of the country it is necessary to carefully study the issues as well as the approaches of e-banking expansion in the country. Hence in the current study the researchers tried to investigate the different factors that can be effective on the tendency of villagers to use e-banking services because of the increasing role of e-banking in the monetary system of the country and the presence of several capabilities and opportunities in the rural communities of the country particularly in the Ilam Province so that based on the obtained applicable results the higher authorities related to the field (i.e. e-banking) can fully understand the present the capabilities and opportunities in order to eliminate the weaknesses and limits and design the pathways and priorities of their expected responsibilities and tasks at hand so that they can choose a proper leading and managing role for directing and supervising the related activities.

In this regard Ilam Province with having 40648 individuals (based on the 2006 census) in the rural population resident in 679 villages with the average literacy of 67 percent, and the unemployment rate of less than 7 percent possesses several capabilities and abilities for development (Iranian Census Organization, 2009) which can be used by the authority figures in several planning and activities. However on the other hand in the banking system quick task completion and being cost-effective is considered one of the most important elements of success in the banking competition arena



and the customers too as the main pillars of determining the winner of this competition highly value technology and speed. In the modern banking era, banks require gathering sufficient information about the customers as well as understanding their needs and priorities and expanding their relationship with them in order to become more efficient. Hence it is necessary that the banks act quickly for preserving their customers. Modern banking requires creative methods, effective customer oriented practices, providing efficient technologies, proper servicing and satisfying the needs of the customers. Any bank which can be more successful regarding the above-mentioned criteria can be more successful in the competition arena for attracting more resources and in turn stability and efficiency. This is while understanding the needs and priorities of the customers and determining the main barriers facing that is the best and most effective option presented to the banks in order to realize their objectives, since identifying the needs and priorities of the customers regarding the e-banking particularly among the rural communities have not yet attracted the sufficient amount of attention and a massive section of the national population generally and Ilam Province specifically constitute the rural communities. Carrying out these studies will help the decision makers and marketers to focus their attentions on these factors while designing their marketing campaigns. Based on the above-mentioned issues the main question of the current paper is that what are the most important socio-cultural and psychological factors effective on the tendency of the villagers to use e-banking services?

## 2. Literature Review And Hypotheses

### 2.1. Literature Review

Regarding the subject matter of the current study several studies have been done in Iran and other countries some of which are briefly visited in the following:

The results of the study carried out by (Gilani Nia and Mousavian, 2009) regarding the effective factors on the tendency of the customers to use the services showed that the impacts of different levels of the factors affecting the tendency of customers to use e-banking services were varied. In a study carried out by (Seydi Zadeh et.al, 2008) they dealt with identifying and rating the driving factors behind expanding e-banking as well as identifying and rating challenges and limitations of the e-banking system in Iran. The results of their study showed that designing the strategic programs by each bank based on the framework of the country's electronic infrastructure is necessary for expanding the e-banking plans for increasing the velocity of service delivery and improving their competitive stance which will in turn lead to more efficiency and the profits from this added efficiency will compensate the service delivery costs. Moreover increasing the resources of high priority variables will compensate low priorities, reduces the number of staff and reduces the service delivery costs. (Babazadeh, 2005) in his dissertation titled "investigating the barriers to establish and expand e-banking in Iran" using a survey type research (questionnaire) reached the conclusion that low awareness extent of people regarding the benefits of e-banking, the weakness of the legal structure for entering the electronic environment, the governmental structure of commercial and professional banks, the weakness of infrastructure, low demand for e-banking and low supply of e-banking services were the main barriers for establishing and expanding e-banking in Iran.

Based on the results of the study carried out by (Salehi Maman, 2004) locational utility, customers' awareness, system integrity, service diversity, access/usage facility, and trust were the six effective factors on the tendency of the customers to use banking cash machines. From the point of view of users "trust" and from the point of view of non-users "locational utility" were the most important factors among the above-mentioned ones. (Teo and Lin, 2009) reached the conclusion that the firm size, higher management support, perceived indirect profits, and the commercial impact of partners had a significant positive relationship with accepting e-buying and the type of industry was not at all related to this variable. (Laukkanen, 2007) in his study showed that efficiency, facility and security were among the most important customers' needs which differentiate their perceived value of mobile and internet banking and the security were the main concern. The results of this study confirm the necessity of increasing managers' information regarding the difference between the perceived value from different e-banking channels so that they can enact some measures in order to help their customers accept these channels more easily.

The results obtained by (Pour Mirza, 2008) show significant differences among the demographic characteristics of the customers as well as their behaviors. Moreover the desk in the bank is specified as the most popular channel for the customers followed by ATMs, e-banking, phone banking, and email banking. Email banking receives the lowest usage rate from the customers. The demographic characteristics of the customers have a significant relationship with accepting e-banking, along the way a better understanding of the e-banking efficiency was observed.

The results show that security measures and low awareness about the e-banking and technical knowledge are the most important and fundamental barriers for accepting e-banking. (Azizi Sarxani et al, 2008) in their paper reached the conclusion that cultural-educational factor needs more attention and improvement in comparison to other factors. The results of the study carried out by (Seyyed Javadin and Yazdani, 2005) show that technology acceptance model is a proper model for explaining the using behavior of e-banking services. And indeed the perceived attitudes of the individual towards the facility of using e-banking services and usefulness of these services as well as self-efficiency of the individual in using computers have a direct relationship with the willingness to use these services.

### 2.2. Reserach Hypothesis

In this study two main hypotheses are analyzed:

2.2.1. *Socio-cultural factors are effective on the tendency of villagers to use e-banking services*

2.2.2. *Psychological factors are effective on the tendency of villagers to use e-banking services*

## 3. Methodology

### 3.1. Research Goal

The main objective of the current paper was to investigate the impacts of socio-cultural and psychological factors on the tendency of villagers to use e-banking services in the time period between 2012 and 2013. To test the propositions, a field survey using questionnaires was conducted.

### 3.2. Sample and Data Collection

The current paper is an applied study considering its objectives and regarding the extent of ability to control the independent variables of the

research it is a non-experimental study. The analysis used in this study is descriptive-causal as well as correlative. The main data gathering tool in the current study is a made questionnaire which is designed and executed based on the conceptual background of the subject matter and the objectives and hypotheses of the study. This questionnaire was designed with four parts. The first part gathered the information on the demographic characteristics of the population and the second part 20 Likert-organized questions are asked to determine the tendency of the villagers. In the third part 30 questions for measuring psychological factors and 5 questions for measuring socio-cultural factors are presented. All the questions are designed based on closed six-option answers. Contextual and facial validity of the questionnaire were confirmed by a panel of experts in agricultural training and expansion including the professors at the Islamic Azad University of Ilam and Ilam University and after revising the ambiguous questions based on their points of views the

reliability of the questionnaire was tested using Cronbach's Alpha coefficient and based on the obtained value ( $\alpha = 84.4$ ) it is obvious that the questionnaire can finely assess the research variables. The statistical population of this study includes all the customers of rural branches of Agricultural Bank in Ilam Province (N=82885). Among these 120 participants were chosen through sample size determination formula and they were studied using stratified random sampling method. The independent variables of this study include psychological and socio-cultural factors and the dependent variable is the tendency of the villagers to use electronic services of Agricultural Bank

3.3. Analyses and Results

The data analysis task was done using the SPSS software application and it was carried out in two levels; namely descriptive statistics (center-oriented statistics and distribution) and analytical statistics (Spearman's Correlation Coefficient in order to test the correlational hypotheses of the research) and multiple regression analysis in order to determining of overall impact of Independent variable on the variances of dependent variable.

4. Result and Discussion

4.1. Descriptive studies

4.1.1. Determining the Ratings of Variables Related to Tendency to Use E-Banking Services

The extent of the tendency to use e-banking services was tested based on 20 items. In order to better describe these items the obtained information was formatted using Likert's five-option spectrum. This spectrum includes "very little", "little", "average", "much" and "very much". The quantitative value corresponding to "very little", is 1 and 5 is allocated to "very much". In order to determine the ranks of these items coefficient of variance (CV) was used which indicates the priority of the items regarding their positions in the ratings. It should be noted that here the average ratings are not to be considered as interval average. The ratings of the items are presented in Table 1.

Table 1. The Ratings of Variables Related to Tendency to Use E-Banking Services

Item	Mean	SD	CV	Rank
How much do you intend to use ATMs in the future?	3.68	1.30	0.35	1
How much do you consider using POS devices appropriate?	3.66	1.34	0.37	2
How much do you consider using internet appropriate for carrying out banking practices?	0.36	1.37	0.38	3
How much do you intend to use POS devices in the future?	3.66	1.39	038	4
How much do you consider using ATMs as a favorite experience?	3.42	1.31	038	5
How much do you consider using cellphones appropriate for carrying out banking practices?	3.55	1.40	0.39	6
How much do you currently use POS devices?	3.39	1.35	0.40	7
How much do you consider using POS devices as a favorite experience?	3.39	1.36	0.40	8
How much do you consider using cellphones for banking as a favorite experience?	3.53	1.42	0.40	9
How much do you consider using ATM devices appropriate?	3.58	1.45	0.40	10
How much do you consider using phones appropriate in banking services?	3.38	1.37	0.40	11
How much do you intend to use internet for banking purposes in the future?	3.52	1.54	0.44	12
How much do you intend to use phones for banking purposes in the future?	3.42	1.51	0.44	13
How much do you currently use ATMs?	3.19	1.41	0.44	14
How much do you consider using internet for banking purposes as a favorite experience?	3.32	1.54	0.46	15
How much do you intend to use cellphones for banking purposes in the future?	3.37	1.61	0.48	16
How much do you consider using phones for banking purposes as a favorite experience?	3.09	1.54	0.50	17
How much do you currently use phones for banking practices?	2.39	1.63	0.68	18
How much do you currently use cellphones for banking practices?	1.70	1.69	0.70	19
How much do you currently use internet for banking practices?	1.98	1.68	0.85	20

4.1.2. Determining the Ratings of Variables Related to Psychological Factors

In order to investigate psychological factors 30 items in a five-option Likert spectrum were used. This spectrum includes "very little", "little", "average", "much" and "very much". The quantitative value corresponding to "very little", is also 1 and 5 is allocated to "very much". In order to determine the ranks of these items coefficient of variance (CV) was also used. The rankings of these items are presented in Table 2. In order to better understand and rank the items when the average values are close, the standard deviation for each item is also indicated.

Table 2. The Ratings of Variables Related to Psychological Factors

Item	Mean	SD	CV	Rank
How much do you consider using POS devices useful in increasing the speed and decreasing the cost of banking practices?	3.76	1.24	0.33	1
How much do you consider using cellphone devices useful in increasing the speed and decreasing the cost of banking practices?	3.85	1.29	0.33	2
How much do you consider using POS devices useful in eliminating time and location limitations?	3.66	1.26	0.34	3
How much do you consider using ATMs useful in increasing the speed and decreasing the cost of banking practices?	3.69	1.31	0.36	4
How much do you feel secure while using POS devices for banking practices?	3.45	1.23	0.36	5
How much do you consider learning to use POS devices easy?	3.54	1.29	0.36	6
How much do you feel secure while using ATMs for banking practices?	3.52	1.29	0.37	7
How much do you consider using internet useful in eliminating time and location limitations?	3.81	1.40	0.37	8
How much do you consider using ATMs useful in eliminating time and location limitations?	3.67	1.36	0.37	9
How much do you consider using cellphones useful in eliminating time and location limitations?	3.70	1.39	1.38	10
How much do you consider using internet useful in increasing the speed and decreasing the cost of banking practices?	3.73	1.42	0.38	11
How much do you consider learning to use ATMs easy?	3.41	1.34	0.39	12
How much are you skilled in using POS devices?	3.42	1.36	0.40	13
How much do you consider learning to use cellphones for banking practices easy?	3.42	1.36	0.40	14
How much do you feel secure in using e-banking services on a whole?	3.23	1.29	0.40	15
How much do you consider using phones useful in increasing the speed and decreasing the cost of banking practices?	3.55	1.43	0.40	16
How much are you skilled in using ATMs?	3.48	1.40	0.40	17
How much do you feel secure while entering your password in e-banking practices?	3.05	1.28	0.42	18
How much do you consider using phones useful in eliminating time and location limitations?	3.48	1.47	0.42	19
How much do you feel secure while using cellphones for banking practices?	3.16	1.38	0.44	20
How much do you feel secure while using phones for banking practices?	3.16	1.38	0.44	21
How much do you consider learning to use phones for banking practices easy?	3.06	1.47	0.48	22
How much are you skilled in using phones for banking practices?	2.95	1.42	0.48	23
How much is the e-banking network secure against errors while cashing in or out?	2.91	1.40	0.48	24
How much do you feel secure while using internet for banking practices?	2.96	1.45	0.49	25
How much are you skilled in using cellphones for banking practices?	3.06	1.59	0.52	26
How much do you consider learning to use internet for banking practices easy?	2.97	1.55	0.52	27
How often do you encounter security-related dysfunction or error while using e-banking services?	2.68	1.46	0.55	28
How much are you skilled in using internet for banking practices?	2.67	1.51	0.57	29
How much do you think insurances protect you against possible internet abuses of your credit cards?	2.62	1.52	0.58	30

4.1.3. Determining the Ratings of Items Related to Socio-Cultural Factors

In Table 3 the ratings related to the items concerning socio-cultural factors are presented. Based on the results shown in this table it can be said that the item “the extent of proper culture in accurate use of e-banking facilities and services” is the most important and the item “people’s awareness regarding the structure and functioning of e-banking services” is the least important. Based on the obtained total average (3) it can be said that agreeing with the items of this factor on the part of the participants is average.

Table 3. Ratings of Items Related to Socio-Cultural Factors

Item	Mean	SD	CV	Rank
The extent of proper culture in accurate use of e-banking facilities and services	3.13	1.26	0.40	1
People's awareness regarding the benefits of e-banking	3.00	1.24	0.41	2
The extent of resistance on the part of those who use traditional old systems against e-banking modern systems	3.04	1.28	0.42	3
The extent of the dependency on foreign countries in providing e-banking knowledge and technology	3.11	1.36	0.44	4
People's awareness regarding the structure and functioning of e-banking services	2.98	1.34	0.45	5

*4.2. Analytical Statistics (Data Analysis and Testing Research Hypotheses)*

*4.2.1. Correlation studies*

In the current study Spearman's Correlative Coefficient is used for testing the two correlational hypotheses of the study namely the relationship between socio-cultural and psychological factors with the variable of the tendency of the villagers to use e-banking services. The obtained results are summarized in Table 4.

Table 4. The Correlation Coefficient among the Research Variables

Hypothesis	The First Variable	The Second variable	r	P-Value	Result
Socio-cultural factors are effective on the tendency of villagers to use e-banking services	Socio-cultural factors	The tendency of the villagers	0.47	0.000	H1 Accepted
Psychological factors are effective on the tendency of villagers to use e-banking services	Psychological factors	The tendency of the villagers	0.55	0.000	H1 Accepted

The obtained Spearman's correlative coefficient for the relationship between the tendency of the villagers and psychological factors ( $r=0.556$ ) shows that with a 99 percent confidence it can be said that the relationship between these two variables is significant in 0.01 significance level ( $p=0.0000$ ). In other words from the point of view of participants by improving the status of this factor their tendency towards using e-banking services is also increased. Moreover the obtained Spearman's correlative coefficient for the relationship between the tendency of the villagers and socio-cultural factors ( $r=0.447$ ) shows that with a 99 percent confidence it can be said that the relationship between these two variables is significant in 0.01 significance level ( $p=0.0000$ ). In other words from the point of view of participants by improving the status of this factor their tendency towards using e-banking services is also increased.

*4.2.2. Multiple Regression Analysis:*

Multiple regression analysis is desirable for studying the effects of multiple independent variables including the experimental variables on the dependent variable. Generally the objective in applying the multiple regression analysis is to create a linear combination of independent variables so that it shows the highest possible correlation with the dependent variable. Hence, this linear polynomial can be used for predicting the values of the dependent variable and evaluating the relative importance of each independent variable in predicting the given dependent variable. This method is capable to use all kinds of variables with great accuracy and ease. Moreover it uses the maximum extent of data in explaining the different distributions. In this section the stepwise multiple regression analysis is used. The stepwise method is one in which the strongest variables enter the equation individually and this goes on until the significance test error reaches 5 percent.

Table 5. The Regression Model Summary

Step	R	R Square	Adjusted R Square
1	0.660 <sup>a</sup>	0.435	0.432
2	0.711 <sup>b</sup>	0.506	0.501

Table 6. Significance Levels and the Impact Extent of Variables Entered into the Model

Steps and Variables Entered in Each Step	Non-Standard Regression Coefficient		Standard Regression Coefficient	t	Sig.	95.0% Confidence Interval for B		
	B	Std. Error	Beta			Lower Bound	Upper Bound	
	1	Constant Coefficient	0.895			0.189	0.660	4.723
	Psychological Factor	0.024	0.002		12.928	0.000	0.020	0.028
2	Constant Coefficient	0.533	0.189	-	2.821	0.005	0.161	0.906
	Psychological Factor	0.019	0.002	0.516	9.490	0.000	0.015	0.023
	Socio-Cultural Factor	0.289	0.052	0.302	5.562	0.000	0.186	0.391

As can be seen from Tables 9 and 10 the regression analysis progressed for three steps. In the first step the psychological factor is entered into the equation and its correlation coefficient (R) regarding the dependent variable of the tendency to use e-banking services is calculated to be 0.51. In this step the determining coefficient value (R<sup>2</sup>) equals 0.435 and the adjusted determining coefficient (R<sup>2</sup> Adj) equals 0.432, which indicate that in the first step 43.2 percent of the total changes in the tendency to use e-banking services depends on the status of the psychological factor. In the second step by entering the second variable (socio-cultural factor) the multiple correlation coefficient (R) increases to 0.711, while the determining coefficient (R<sup>2</sup>) rises to 0.506 and the adjusted determining coefficient (R<sup>2</sup> Adj) increases to 0.501. In other words 50.1 percent of the changes in the dependent variable of the tendency to use e-banking services are explained by the two variables entered into the model. In other words it can be said that almost 48.6 percent of the fluctuations related to the effective factors on the tendency of the participants to use e-banking services is related to those factors which are not considered in this study. Moreover regarding the implications of the results it can be said that for each unit of standard deviation in the independent variable of psychological factor, the extent of the tendency to use e-banking services experiences 0.432 unit of standard deviation increase or for every unit increase in the socio-cultural factor the extent of tendency to use e-banking services increases with the rate of 0.501 units. The F value in Table 7 is significant in the 99 percent level (Sig=0.000) which indicates the fact that the regression is significant.

Table 7. The Values and Significance Levels of F Statistic

Step	Degree of Freedom	F	Significance Level
The First Step	1	167.133	0.000 <sup>a</sup>
The Second Step	2	110.567	0.000 <sup>b</sup>

Finally regarding the fact that at the end of the third step the error rate of the test reaches 0.05 the regression model is completed in step two. Hence, on the whole three variables are entered into the regression model and after standardization of the regression coefficients the final regression equation can be written as:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_nX_n \Rightarrow Y = 0.53 + 0.01X_1 + 0.28X_2$$

Where *a* the constant or the x-intercept, *b* the regression coefficient or the slope of the curve, *X*<sub>1</sub> the variable of psychological factor and *X*<sub>2</sub> is the variable of socio-cultural factor.

## 5. Conclusion

Although e-banking possesses multiple layers but the differentiating factor of e-banking is the presence of software and hardware systems which process the financial information (Kamel and Hassan, 2007). In other words, the optimal integration of all the practices of a bank using modern information technologies provides all the required services to the customers (Blount et al, 2008). But the issue that all the scholars of the field agree upon is making proper use of software, hardware and network technologies and the integration of all the practices as well as being customer-oriented. Today e-banking is more a necessity than an advantage, since firstly virtual electronic banks who are active on the internet are capable to deliver quicker, perfect, more accurate and more desirable services to customers all around the world; secondly the delay caused by the traditional systems causes the banks to lose golden opportunities to attract new customers. Also the elimination of pen and paper systems of trading document exchange in developed countries renders communicating with these countries using old systems impossible. Today the key factor in accepting e-banking is the customer's satisfaction and trust in the bank which indirectly affect accepting e-banking. On the other hand customer's participation is very important in accepting the e-banking practices since this causes decreasing or elimination of transaction between the organization and the customer. The participation of the customer and the bank is a factor that affects the quality of services, satisfaction and finally preserving the customers this is while many people are cautious in using new technologies (Nagsmi, 2004).

Since the psychological factor affects the tendency of customers to use e-banking services and this factor in turn includes three sub-scales of perceived facility, perceived self-usefulness and perceived security, the more the levels of these scales are reported higher by the customers the more their tendency to use e-banking services. This study was carried out to investigate the impact of socio-cultural and psychological factors on the tendency of villagers to use e-banking services in the Agricultural Bank branches in Ilam Province. In order to realize this objective, 120 customers in the rural branches of this bank were selected as the study sample using stratified random sampling method to participate in the study. The results show that the participants have a good opinion about e-banking and their attitude towards using this new phenomenon was positive and this very issue can be the competitive advantage of the Agricultural Bank in its competition with other banks. The results of the study showed that socio-cultural and psychological factors have a significant impact on attracting the public to use e-banking, with more than 50 percent of the tendency of people to use e-banking due to the presence of these factors. The results of the current study were in congruity with the results obtained by Seidizadeh et al (2008), Babazadeh (2005), Salehi Maman (2004), Laukkanen (2007), Pour Mirza (2008), Azizi Sarxani et al (2008) and Seyyed Javadin and Yazdani (2005).

## 6. Recommendation

1- Since the psychological factor affects the tendency of the customers to use e-banking services and this factor in turn includes three sub-scales of perceived facility, perceived self-usefulness and perceived security, the more the levels of these scales are reported higher by the customers the more their tendency to use e-banking services. Hence it is recommended that banks try to improve these sub-scales by:

- \* Simplifying the design of the website dedicated to internet banking services
- \* Simplifying and shortening the banking transactions' procedures and processes
- \* Easy access to e-banking tools such as the internet
- \* Holding educational courses in order to familiarize the customers with e-banking tools and services and requiring their opinions regarding the system being user-friendly
- \* Providing the capability to practice the majority of banking services through the e-banking system
- \* Accelerating the transactions using electronic systems so that the customers can save time and realize that doing the transaction through electronic systems is much better than standing in a line inside the bank.
- \* Familiarizing the customers with security measures and standards observed by the bank in order to increase their awareness regarding the security issues (if the bank has a high security capability the customers trust them more easily)
- \* The issue of insurance against internet fraud and possible errors during cash in or cash out should be considered seriously so that in the future by developing this system and increased customer awareness their tendency towards using e-banking services will also increase

2- Since another effective factor on the tendency of people to use e-banking services is the socio-cultural factor the following measures are recommended:

- \* Establishing the culture of using e-banking capabilities in the society based on building proper cultural basis for trust in this banking system and carrying out educational and advertising programs
- \* In order to inform the stakeholders about the advantages of e-banking we not only have to emphasize on the basic advantages of this system such as time saving, cost saving and so on we also have to focus on the public advantages such as decreasing fuel consumption, traffic congestion, environment pollution as well as decreasing the cost of printing new bills and so on.

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## OFP-011

**Bank and Insurance of Garbage Become New Land Investment**Fauzi Sania, Faiz Ahadina<sup>b</sup>, Dimas Kalimasyada<sup>a</sup><sup>a</sup>Tanri Abeng University, Jl. Swadarmaraya No. 58 Ulujami, Pasanggrahan, South Jakarta<sup>b</sup>Garut Youth Development, Jl. Gordah No. 49 Jayawaras, Tarogong Kidul, Garut**Abstract**

Nowadays with the growing public interest to invest in financial and insurance sector to prepare for their future in a professional company that offers profitable return to the customers is big, so it makes a lot of companies create insurance system and a profitable investment, Indonesian Life Insurance Association (AAJI) launch, the number of customers jumped 92.5%, from 45.77 million in 2012 to be 88.13 million until the end of last year. Customer growth was due to higher number of insured individuals and groups (Christine Novita Nababan, 2014) and with the movement of money into the large numbers and be able to fund many community and developed into other investments sectors, but on the other hand there is the idea of creative ideas from the community by creating a system like the small scope of investment in waste management, with bring up the idea to make a bank & insurance trash or garbage that is supported by sponsors and donors solely, with the aim to help the community in economic and environmental concerns to reduce the spread of litter and the public and people support for banks and trash insurance is so great that encourages development but the public is less aware that it is able to produce the financial sector is very large when seen from the large banks and insurance support for this garbage from public.

**1. Introduction**

By looking at the system that has been used by large corporations to manage finance today, so it makes a great opportunity, if the bank & insurance is able to developed using enterprise management systems of banks and insurance professional, by rotate of financial into other sectors not only in the trash, so that it can create the rotate of money in larger quantities than usual and also there will be 2 things capable in profitable in this case, the public was able to get profit with the company in large numbers financial and also spreading and waste will be reduced significant caused by most people want to join bank and insurance garbage, so that a new change in the management of banks and insurance waste management more dynamic in financial rotation can invest into others sectors, so this is able to reduce the number of bankrupt when using only donators. in data collection method directly participatory joined to the existing cases by random sampling join the societies, with a gathering of about 10,000 people to be part of this research to be sure everyone is capable of carrying 1 kg of waste to be collected, so the data will be more accurate in its calculations that consist in Malang areas, Depok, Jakarta and also Garut, each region consists of 200 banks belonging garbage, collection the data is needed about 12 months in its calculations, because researchers must try to determine the potential of each bank rubbish of how much money is collected monthly ordinary and how much waste is capable collected. The collection of data from 10,000 people have researchers assisted by five members, with the task among other things, to invite the community to join, researching potential society, is recording the incoming data, collect garbage that has been there, selling to major collectors. Thus in the future bank and insurance are able to independently and make new economic land which make welfare of society and also generate income that is promising in the long-term investment, without relying on the help of sponsors or donors who continually poured in helping Bank and insurance garbage.

Waste problem in Indonesia is still a thing will continue to happen. In some big cities, move to a more care to maintain cleanliness has begun to frequent. Jakarta city government, for example, began to build some trash on every street corner, and made a special place for organic and non-organic waste. Determination to make Indonesia into a net has been done by Indonesia net movement in 2020 were carried out by Ministry of Environment. Active government invites the public to reduce the amount of waste by activity Reduce, Reuse and Recycle (3R).

*Reduce* is to reduce waste of plastic materials such as beverage bottles. Ministry of Environment advised the public to bring their own bottle instead of using plastic bottles packaging that many are sold in supermarkets.

*Reuse* is reuse of used goods such as cans of food or drinks to be made into some equipment such as piggy banks, or a stationery.

*Recycle* is recycling of waste, such as making handicrafts from plastic waste or used goods unused.

This activity is more effective than not empower garbage or litter because it can disturb the health. In addition there are other alternatives that you can do to manage waste properly, namely:

1. Disposing of waste in place no matter where you are. If you do not find the trash, save the first litter in your bag, and dispose of place when it is found the trash.

2. It is now widely found bins of organic and non-organic. Dispose of garbage according to the type of place that has been provided.

3. Reduce the excessive use of plastic because it can harm the environment and damage health in the long term. Plastics manufacturing process produces air pollution. Gradually, you can reduce the use of plastic, for example by carrying shopping bags when going shopping monthly.

This research aims to know is better in financial system for banks and insurance garbage in the present and also in the future use professional system bank and insurance, which could rotate into other investments sector and it can be generating income bigger than use past system, and can manage many clients without limitation if anyone wants to join with professional management, so that the banks and insurance garbage in prediction can make a new

land economics sectors, so that the investment can be sustainable in a very long period of time, with use financial system and insurance professionals can encourage or rotate the financial to property, mutual funds, stock exchange and credit as well as major banks and insurance companies, so that not only the velocity of waste in the community and not just rely on donors or sponsors in terms of its management.

## 2. Literature Review And Hypotheses

Whatever is perceived as rubbish, will undoubtedly be treated like garbage anyway. Thrown away and not processed, like goods that do not have a use value (Bank Sampah Community Centre Surabaya, 2012)

“Trash” on-the-perception as valuables. He will be treated like a value item that has value to sell. This is what happened in the Trash Bank System. A workflow management or waste management, especially inorganic, which is carried from the source, households. Garbage managed collectively and systematically, so that it can provide benefits to the environment also affect economical for society (Bank Sampah Community Centre Surabaya, 2012)

Although only rolled out this year, citizens involved in the waste bank in Depok is quite high. Currently Garbage Bank Depok (BSD) claims to have 107 bank clients built with as many as 4,600 people (Virdani Harya, 2013)

Every week, Bank Garbage Green GPA can collect up to 70 kg of inorganic waste, while inviting the entire community complex Griya Asri Jewel to be a customer of Bank Garbage Green GPA to address the problem of litter in the community (Laurance Dami, 2014)

Bank of garbage is a strategy to build public awareness in order to ‘be friends’ with garbage to obtain direct economic benefits of garbage. Thus, the bank cannot stand on its own trash but must be integrated with the 3R movement so that the direct benefits perceived not only the economy, but the development environment clean, green and healthy (Sudirman, 2014)

The bank this garbage, each average household save about 50 thousand dollars per month. Over time, the amount collected hefty helping create membaya household and school (R.Salim, 2013)

Hypothesis the data in Bank and Insurance of Garbage in old system calculations without professional system, show fluctuated profit and do not stable in expenses and make the profit margin and purchased price effected, with sales volume 1,500,000 kg the price, the revenue 9,600,000,000 in rupiah and margin profit 25%, and the net profit is 300.000.000 in a years because the expenses and tax increase because do not stable profit margin.

## 3. Methodology

### 3.1. Research Goal

This research aims to determine the amount of the benefits of using a garbage bank professional calculation, in this research we make the number of sample calculations 10,000 people in field by using participatory and they took every day one person 1 kg of waste either organic or non-organic so that the research can be known how much income can be from the waste bang with price already in the set, in order the income can be invested to the others sector, such as property, Stock Exchange, agricultural, in a year bank of garbage run.

### 3.2. Sample and Data Collection

Research in data collection method directly participatory joined to the existing cases by random sampling join the societies, with a gathering of about 10,000 people to be part of this research to be sure everyone is capable of carrying 1 kg of waste to be collected, so the data will be more accurate in its calculations that consist in Malang areas, Depok, Jakarta and also Garut, each region consists of 200 banks belonging garbage, collection the data is needed about 12 months in its calculations, because researchers must try to determine the potential of each bank rubbish of how much money is collected monthly ordinary and how much waste is capable collected.

The collection of data from 10,000 people have researchers assisted by five members, with the task among other things, to invite the community to join, researching potential society, is recording the incoming data, collect garbage that has been there, selling to major collectors.

Executed we provide guidance in advance about this project that this is a good project to improve the financial future if the waste bank uses in its management of banking system, after it every day we give them the direction of the amount of garbage that must be taken, then we buy the waste and on the record based on the amount of waste, within a month we are doing so then we try to do this by continuing to trash 10,000 thousand people joined and maximum results in accordance with design researchers, people with the spirit of helping that collected 10,000 people in the implementation,

### 3.3. Analyses and Results

We conduct research in the 12-month results are in use by professional banking showed the maximum results in which the fund is able to invest in other things, with a very large number, the ability of the funds obtained from the waste bank for one year were able to fund investment property and agriculture, such as the results described below, with a turnover of 3000.000 kg garbage About a year with 1,500,000 comparison of organic and non-organic 1,500,000, was predicted to produce billions of funds to calculations described below.



## FULL PAPERS

Profit Margin						
Organic		35%	35%	35%	35%	35%
Non Organic		35%	35%	35%	35%	35%
Handmade		50%	50%	50%	50%	50%
Sales Volume						
Organic	Unit	1,500,000	1,605,000	1,717,350	1,837,565	1,966,194
Non Organic	Unit	1,500,000	1,605,000	1,717,350	1,837,565	1,966,194
Handmade	Unit	120,000	128,400	137,388	147,005	157,296
TOTAL		3,120,000	3,338,400	3,572,088	3,822,134	4,089,684
Selling Price						
Organic	IDR	2,700	2,889	3,091	3,308	3,539
Non Organic	IDR	2,700	2,889	3,091	3,308	3,539
Handmade	IDR	71,250	76,238	81,574	87,284	93,394
Purchased Price per unit						
Organic	IDR	2,000	2,140	2,290	2,450	2,622
Non Organic	IDR	2,000	2,140	2,290	2,450	2,622
Handmade	IDR	47,500	50,825	54,383	58,190	62,263
Revenue						
Organic	IDR	4,050,000,000	4,636,845,000	5,308,723,841	6,077,957,925	6,958,654,028
Non Organic	IDR	4,050,000,000	4,636,845,000	5,308,723,841	6,077,957,925	6,958,654,028
Handmade	IDR	8,550,000,000	9,788,895,000	11,207,305,886	12,831,244,508	14,690,491,838
TOTAL		16,650,000,000	19,062,585,000	21,824,753,567	24,987,160,358	28,607,799,894
COGS						
			14%	14%	14%	14%
Organic	IDR	3,000,000,000	3,434,700,000	3,932,388,030	4,502,191,056	5,154,558,539
Non Organic	IDR	3,000,000,000	3,434,700,000	3,932,388,030	4,502,191,056	5,154,558,539
Handmade	IDR	5,700,000,000	6,525,930,000	7,471,537,257	8,554,163,006	9,793,661,225
TOTAL		11,700,000,000	13,395,330,000	15,336,313,317	17,558,545,117	20,102,778,304

The data below describes the system of records that are made by bank garbage in one year and explained prospect in the next 5 years according to financial science, ranging from purchasing to sales, with the data below lists the results are better able to be received.

*The first table describes the profit margin, sales in one year, the reception of garbage in one year, expenditure which must be issued and the revenue that will be generated*

*This is the Calculation in Rupiah to be Dollar Conver to 13.000  
Example: 11,700,000,000: 13.000 = \$900,000*

Data above shows, sales volume means the amount of garbage we sell to the major of receiver, in a day there are 10.000, there were 10,000 people came to bring 1 kg of waste to be collected and we streamline acceptance of this waste in the first year only 300 days so if in multiply 10,000 to 300 days, the results can is 3000,000 1500,000 which is organic and non-organic rest, purchase price per kg it is Rp 2000 or \$ 0.2, total revenue that we can be of one year with repeat sales is Rp. 2,700 / kg and results in the can is Rp.4,050,000,000 of organic and Rp.4,050,000,000 of non-organic, these outstanding results obtained from the sale of trash.

*This second data shows that the total expenditure in the bank doing garbage and also taxes that must be paid to generate net profit*

COGS	Year 1	Year 2	Year 3	Year 4	Year 5
Organic	3,000,000,000	3,434,700,000	3,932,388,030	4,502,191,056	5,154,558,539
Non Organic	3,000,000,000	3,434,700,000	3,932,388,030	4,502,191,056	5,154,558,539
Handmade	5,700,000,000	6,525,930,000	7,471,537,257	8,554,163,006	9,793,661,225
Depreciation	19,600,000	19,600,000	19,600,000	19,600,000	19,600,000
Amortization	30,000,000	6,000,000	6,000,000	6,000,000	6,000,000
<b>GROSS PROFIT</b>	<b>4,900,400,000</b>	<b>5,641,655,000</b>	<b>6,462,840,250</b>	<b>7,403,015,242</b>	<b>8,479,421,590</b>
<b>OPERATING EXPENSES</b>					
Salary & THR	101,400,000	108,498,000	116,092,860	124,219,360	132,914,715
Electricity	12,000,000	12,840,000	13,738,800	14,700,516	15,729,552
Fees & Surcharges	6,000,000	6,420,000	6,869,400	7,350,258	7,864,776
Marketing	12,000,000	12,840,000	13,738,800	14,700,516	15,729,552
Space Rental	25,320,000	27,092,400	28,988,868	31,018,089	33,189,355
Telecommunication	12,000,000	12,840,000	13,738,800	14,700,516	15,729,552
Transportation	7,200,000	7,704,000	8,243,280	8,820,310	9,437,731
Internet	3,600,000	3,852,000	4,121,640	4,410,155	4,718,866
Stationaries	1,200,000	1,284,000	1,373,880	1,470,052	1,572,955
Maintenance	33,300,000	35,631,000	38,125,170	40,793,932	43,649,507
<b>TOTAL OPERATING EXPENSES</b>	<b>214,020,000</b>	<b>229,001,400</b>	<b>245,031,498</b>	<b>262,183,703</b>	<b>280,536,562</b>
		<i>1%</i>	<i>1%</i>	<i>1%</i>	<i>1%</i>
<b>OPERATIONAL PROFIT</b>	<b>4,686,380,000</b>	<b>5,412,653,600</b>	<b>6,217,808,752</b>	<b>7,140,831,539</b>	<b>8,198,885,028</b>
<b>OTHER REVENUE</b>					
Interest Received	0	0	0	0	0
<b>OTHER EXPENSES</b>					
Interest Paid	0	0	0	0	0
<b>PROFIT BEFORE TAX</b>	<b>4,686,380,000</b>	<b>5,412,653,600</b>	<b>6,217,808,752</b>	<b>7,140,831,539</b>	<b>8,198,885,028</b>
<b>TAX</b>	<b>(1,171,595,000)</b>	<b>(1,353,163,400)</b>	<b>(1,554,452,188)</b>	<b>(1,785,207,885)</b>	<b>(2,049,721,257)</b>
<b>NET PROFIT</b>	<b>3,514,785,000</b>	<b>4,059,490,200</b>	<b>4,663,356,564</b>	<b>5,355,623,654</b>	<b>6,149,163,771</b>

*This is Calculation in Rupiah to be Dollar convert to 13.000  
Example: 3,514,785,000:13,000 = \$270,368*

The above data shows that the positive impact of the use of the method of the bank so that it looks more effective in its implementation and the goals to be achieved more easily in reach, total COGS of first years already covered 4,900,400,000 the amount it's shows positive impact even in the five years, and also in terms of operating expenses the amount are not significant effecting to the others, and the net profit is plus or positive 3,514,785,000, 4,059,490,200, 4,663,356,564, 5,355,623,654, 6,149,163,771, capabilities of this system trusted by seeing the data above, although the bank of garbage can be paying the tax in long term without decrease in the total net profit in the first year 1,171,595,000.

The advantages of this system can forecast in the five years capabilities, and the expenses, tax, until little things already measured by this system, new investment from the garbage can be making new transformation, how trash in Indonesia become new land investment like profit in the years 1,2,3,4,5 are 3,514,785,000, and to make this investment trusted in the below show the NPV,IRR and Payback Period of investment in the garbage.

Tahun	Free cash flow	Discount factor	Net present value	Payback period
Year 1	3,412,385,000	86.5%	2,951,155,577	2,951,155,577
Year 2	4,297,158,004	74.8%	3,214,026,728	6,165,182,305
Year 3	4,964,591,500	64.7%	3,211,336,100	6,425,362,828
Year 4	5,696,999,573	55.9%	3,187,003,274	6,398,339,374
Year 5	6,536,511,204	48.4%	3,162,397,174	6,349,400,448
Continuing value			277,702,013,479	
NPV			293,427,932,332	
IRR			137%	
Average WACC			16%	
Payback period	pada tahun			1

In investment point to see the opportunity and profitable investment NPV and IRR are important, what are both of NPV and IRR view in investment, NPV is the acronym for net present value. Net present value is a calculation that compares the amount invested today to the present value of the future cash receipts from the investment. In other words, the amount invested is compared to the future cash amounts after they are discounted by a specified rate of return. IRR' The discount rate often used in capital budgeting that makes the net present value of all cash flows from a particular project equal to zero. Generally speaking, the higher a project's internal rate of return, the more desirable it is to undertake the project (www.google.com, 2015).

NPV of Bank of Garbage in the data shows 293,427,932,332 positive, supported by increasing and positive amount of Net Present Value In First year until 5 years, 2,951,155,577 with discount rate up to 86,5% and free cash flow at 3,412,385,000 positive amount, impact of this data directly changing to payback period in the first year already covered no need 3 years like general investment. And IRR is 137% because the NPV already positive and it is make Average WACC the percentage at 16% in view of investment investor believe that the business is profitable.

#### 4. Conclusion

This research aims to compares between old system and common system in professional bank to implement in Bank and Insurance of Garbage become new land investment to be more utilize by society and after conducted the research, the data showed System of Bank and Insurance of Garbage after changing to professional calculations influence to the effectiveness and profitable project directly, with participatory method researcher generate conclude old system get hard to improve in this investment to be more independent without supported by donatur, from total COGS up to 11.700.000.000 between organic and non organic with handmade products, it's generating revenue up to 16,650,000,000 with purchased price per kg is 2000 in rupiah and selling price at 2,700 with sales volume 1,500,000 kg in a year.

In terms of Profit by conducted professional system the profit margin can measured up to 35% each kg at 700 rupiah profit, from 35% margin profit and sales volume 1,500,000 the profit of this investment is 3,514,785,000 in the first years after minus Operating expenses, COGS, Tax. This data is positive and generate profitable investment after conducting the professional system.

Before doing this research the data by old system showed in hypothesis is minus or not profitable because cutting by tax, operational and the profit margin fluctuated is not stable at 35%, influencing to revenue and profit with operational and tax stable, that expenses can not handled by total sales and made minus in the last years, and there is also profit by using old system but is not big as professional system generate because pushed by expenses and fluctuated in margin profit, this system of bank and insurance of garbage by using professional calculations is applied in real life by this system as well to invest in property and stock exchange can be applied.

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**OFF-012**  
**Sustainable Quality Management in Libyan Higher Education:**  
**A Study in Process Innovation**

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**Abstract**

An increasing interest in the implementation of quality management programs in higher education has been observed over the past decade, particularly among developing nations. Previous studies have shown that universities find it difficult to sustain quality programs but global initiatives by UNESCO and UNDP have encouraged the adoption of sustainability in every facet of university systems including education quality. An extensive review of sustainability and quality related literature suggests that a SQM model can be developed for higher education through the integration of sustainability and quality models. This implies that apart from economic considerations, environmental and social dimensions should be included in quality management. In order to move towards this goal, the paper explores links between Sustainability principles (a combination of the Triple Bottom Line and Forum for the Future's Five Capital model) and two quality management approaches – (Deming's Plan Do Study Act (PDSA) and the European Foundation for Quality Management (EFQM)). The paper builds on these literatures through the presentation of data derived from a study of over six hundred respondents engaged with Higher Education in Libya and reports on the synthesis of this literature and data to present a sustainable quality management (SQM) framework consisting of eight core Critical Success Factors (CSF's). The paper will focus on one of these CSF's; the role of leadership

**1. Introduction**

Total Quality Management (TQM) has been a feature of industry motivated by economic competition and the need for quality in products and services, and although it has been traditionally oriented towards the manufacturing industry, it has been adopted by other sectors.

Quality is a determining factor of success for an organization and as such is related to sustainability. Although organizations have adopted and implemented TQM they often have difficulty in sustaining it. Svensson (2006) states that TQM includes values, tools and techniques which need to be sustained in order for organizations to pursue development while at the same time conserving economic, environmental and social resources for future generations. Thus, there is a need for a synergy between sustainability and TQM leading towards Sustainable Quality Management (SQM).

The study on which this paper is based explores the potential synergy between the quality models Plan Do Study Act (PDSA) by Deming and European Foundation of Quality Management (EFQM) and the Triple Bottom Line (TBL) and Five Capitals sustainability models within the context of Libyan Higher Education (HE).

The recent quality of HE in Libya has been unsatisfactory to say the least, in 2013 the country was ranked 103rd globally (WEF World Bank, 2013) a position which has been attributed to the quality of teaching staff, curricula and educational infrastructure, moreover, this problem is further compounded by the fact that there has been a significant increase in HE enrollments in the country since the end of the Gaddafi regime. Although there has been political uncertainty in the country, the interim powers have been fully committed to rebuilding and improving higher education, this has been especially important in the bid to address the high unemployment which stood at 30 percent in 2013 (Clark, 2013).

This paper will address how SQM might contribute to realizing these improvements. The next section will discuss quality management and sustainability and consider how they might complement each other as SQM. An extensive study of how these issues are perceived within Libyan HE is then presented highlighting some of the key critical success factors (CSF's) with an emphasis on leadership. Discussion of these CSF's and the implications of the findings for Libyan HE are then presented in a final section.

**2. Literature Review**

*2.1 Total Quality Management*

Total Quality Management (TQM) is a tool that is used by institutes of higher education to achieve quality in all aspects of the organisation (Zehir et al. 2012). As a quality-oriented approach it focuses on continuous improvement, human resources, process management and customer engagement (Isaksson, 2004) and advocates a company-wide approach rather than simply focusing on the quality of a product or service (Zink, 2007). The implementation of TQM requires an understanding of a number of critical success factors in order to improve organizational processes (Jung, 2003) and has an effect on both quality and innovation performance (Zehir et al. 2012). Importantly, sustainable TQM should be realised over the long term (Dale, 1996).

There are various approaches for achieving TQM, these include Taguchi's parameter design which seeks to eliminate variation in the design and manufacturing processes of products, Six Sigma – a business strategy which seeks to eliminate errors in business processes (Antony, 2008) and Whole System Design – an approach to system design that integrates social, economic and environmental factors towards achieving innovative and sustainable products and services (Mohr, 2006).

In order to clearly identify and implement sustainable TQM rather than considering it as a fad (Karuppusami and Gandhinathan, 2006), Deming's PDSA model can be used with the TQM Implementation Index (TQMII) (Kumar, 2004). Another quality model is the EFQM for measuring performance and standards. Specifically, EFQM is a diagnostic tool that uses internal and external assessment to evaluate the health of an organisation (EFQM, 2010). The internal assessment mode is carried out through self-assessment which raises management awareness of available resources and their allocation; in higher education; this self-assessment is achieved through questionnaires, workshops and simulation (Hides et al., 2004).

### 2.2 Sustainability

The idea of sustainable development was first discussed in a global forum in 1972 at the UN Conference on the Human Environment, this placed concern about the environment at the forefront of the international political agenda (GoF, 2007). Later, in 1987, the report 'Our Common Future' was published by the UN World Commission on Environment and Development and provided the following definition: "Sustainable Development is development that meets the needs of the present generation, without compromising the ability of future generations to meet their own needs" (WCED, 1987, p.8).

Generally, corporate sustainability is about a company engaging in activities that demonstrate that they are incorporating social and environmental concerns into their business activity and interaction with stakeholders (Hediger, 1999). The Triple Bottom Line (TBL) Model is a framework for measuring sustainability that can be translated into business operations (WCED, 1987), it was introduced by Elkington (2014) who stated that there was a need for a paradigm shift in sustainability which linked economic prosperity, environmental quality and social equity (Isaksson, 2004, Lozano, 2003). The Five Capitals Model of Forum for the Future extends the TBL to consider human, social, ecological, economic and manufactured capital but retains ecological capital as a non-negotiable bottom line.

### 2.3 Sustainable Quality Management

The concept of SQM arose from an emphasis on creating a climate of sustainable change within an organisation (Schneider et al., 1996) and the idea that a core feature of TQM is continuity over time which is essentially 'sustainable continuous improvement' (Curry and Kadasah, 2002; Dale, 1996). This relationship between the quality and longevity of a business is viewed in different ways. Read et al. (2000) argue that the relationship is necessary for competitiveness and Svensson (2006) provides a more detailed insight stating that SQM is about the sustainability of the tools and practices of quality management and should integrate other areas such as the environment, economics and ethics.

## 3. Methodology

The study reported below adopts a mixed method approach (Naseem, 2008) to examine how successfully quality and sustainability have been brought together within Libyan Higher Education and explores how receptive different institutions are to the concept of SQM. The methodology for the study is comprised of two main parts; first, the development of the SQM framework through an analysis of the literature, and second, the application of the framework to determine the situation in Libyan education using a questionnaire and semi-structured interviews. In total there were 678 responses to the questionnaire and 28 interviews were conducted.

In the context of quality and sustainability in a higher educational setting, the methodology is centered on exploratory approaches which included a review of the literature about the quality models: Deming's PDSA and EFQM models and sustainability models: Five Capitals and the Triple Bottom Line. A gap analysis of the Libyan higher education system was undertaken to explore how quality and sustainability were related at five institutional levels (academic staff at Tripoli University (ACTU) and Gharyan University (ACGU), non-academic staff at the Quality Centre (NAQC) and HE Secretariat (NAHE) and students of the two Universities (STU)).

### 3.1 Research Questions

A number of research questions were specified by through the literature survey and the theoretical gap analysis; these are as follows:

- What are the significant Critical Success Factors (CSFs) that influence SQM in higher education?
- What are the sub-criteria that link these CSFs with quality and sustainability dimensions?
- What are the linking criteria between PDSA and EFQM models and how are these related to the sub – criteria of research question (2)?
- How do the stakeholders of higher education perceive and evaluate PDSA and EFQM models for implementation in Libya?
- How do the existing PDSA and EFQM approaches need to be modified for SQM evaluation in higher education of developing countries like Libya?

### 3.2 SQM Framework Development

The development of a framework for SQM in HE was based on three main analyses; preliminary analysis of the literature, analysis of quality and sustainability models, and analysis of the potential issues related to the adoption of SQM in HE in Libya (gap analysis). Based on the above analyses a number of critical success factors (CSFs) were identified as primary criteria, and Quality Action Programs (QAPs) as sub criteria; these were then used to inform the questions in the semi-structured interviews and questionnaires.

### 3.3 Questionnaire deployment

The questionnaire was based on the Critical Success Factors (CSFs) and the questions were formulated based on the Quality Action Programs (QAPs) identified in the gap analysis. Questionnaires were distributed within two universities and two non-academic HE institutions the Libyan Higher Education Secretariat at the Ministry of Education (LME), the Libyan Education Quality Assurance and Accreditation Center (LEQAAC) Tripoli University and Gharyan University. It is important to note that Tripoli University is a national level university and Gharyan University is regional thereby allowing for data to be collected about national and regional viewpoints. 1100 questionnaires were distributed to Ministerial and Secretariat staff in LME and LEQAAC and academic and research and administrative staff and post graduate students at the two universities (table 1). A response rate of 61.6 percent was recorded with over 650 questionnaires returned.

Table 1 Institution Category, group identification codes (Group IDs), description and number of respondents involved in the study

Institution	Group ID	Description	Number of Respondents
I Tripoli University	ACTU	Academic staff,	293
Gharyan University	ACGU	Academic staff,	241
Quality Centre	NAQC	Non-academic staff,	27
HE secretariat	NAHE	Non-academic staff,	23
STU	STU	students	94
		<b>Total</b>	<b>678</b>

A total of 28 semi-structured interviews were also undertaken with participants from the five groups selected according to their experience of higher education, quality management, and sustainable development.

3.4 Data and Analysis

Kruskal-Wallis Statistic ‘H’ was used to measure how much the specific survey group ranks differed from the average across all groups and the Mann Whitney Statistic ‘U’ was applied for two independent samples. Broadly, these tests were used to indicate how each group has observed the implementation of a given Quality Action Program (QAP) in their work or study environment; a higher value of KWMR or MWMR implies a higher level of observation of a given QAP and vice – versa. The computed ‘H’ and ‘U’ values were compared for significant difference using the Chi square values. If the computed Chi square value is greater than the tabulated value for a given probability level ‘p’, then the Null hypothesis in that case is rejected. The null and alternate hypotheses for the present study are:

The null hypothesis (H0) = There no significant difference in observation among the groups of a given category at the level of probability indicated by the ‘p’ value

Alternate Hypothesis (HA) = There is a significant difference in observation among the groups of a given category at the level of probability indicated by the ‘p’ value

The measure of sustainability using quantitative data was based on the Sustainability Index (SI) Model presented by Kumar (2004). This evaluated the core issue of TQM sustainability through measuring the quality awareness of respondents; an SI of above 0.5 indicates a positive sustainability evaluation.

A keyword content analysis of the semi-structured interviews was also carried out to explore how sustainable quality management was reflected in different aspects of quality action.

4. Findings and Discussion

The following analysis and discussion will focus on one aspect of the SQM model, leadership. This is both a significant factor but also provides an example of how the wider analysis was undertaken. The results of the study were organised according to the eight identified critical success factors (CSFs) and 72 quality action programmes (QAPs) upon which the questions in both the questionnaire and interviews were based. They are presented as a score for SQM based on a link between Total Quality Management (TQM) and Sustainability tested across 26 groups. In general, a low level of application of CSFs is observed in the Libyan higher education system. This was evidenced by the Group Average for Critical Success Factors (GAC) with low scores of between 2 to 3 as opposed to higher scores of 4 to 5 (Table 2).

Table 2 Group Average Scores (GAC) for CSFs at Institution Level

Category (table 1)	Leadership	Policy & strategy	Continuous Improvement	People Focus	Customer Focus	Process Management	Training	Key Results
Institution								
ACTU	2.23	2.35	2.28	2.37	2.29	2.73	2.02	1.8
ACGU	2.06	2.09	2.13	2.19	1.97	2.13	1.97	1.85
NAQC	2.25	2.33	2.16	2.37	2.24	2.22	2.04	1.93
NAHE	2.12	2.19	1.98	2.04	2.06	2.10	1.96	1.86
STU	2.2	2.16	2.15	2.25	2.07	2.26	2.00	1.92

The CSFs that were performed better in Higher Education (HE) were People Focus and Process Management while Leadership, Policy and Strategy and Continuous Improvement showed medium level performance, and the remaining CSFs including Customer Focus, Training and Key Results indicated a low level of performance.

4.1 Overall Performance of Institutional Groups

Based on a group average for all CSFs Tripoli University and the Quality Centre have shown better performance overall with Gharyan University performing least well overall. For each CSF the ranking for each institution is presented in Table 3. These ranks were further divided into Top, Middle and Lower positions and provide more insight into the CSF level performance of various groups while non-parametric test results were limited to reveal the trends at Quality Action Program (QAP) level.

Table 3 Institutional Ranking of Group Average Scores for CSFs (GACs)

GAC Rank	Leadership	Policy and strategy	Continuous Improvement	People Focus	Customer Focus	Process Management	Training	Key Results
Institution								
1	NAQC	ACTU	ACTU	ACTU	ACTU	ACTU	NAQC	NAQC
2	ACTU	NAQC	NAQC	NAQC	NAQC	STU	ACTU	STU
3	STU	NAHE	STU	STU	STU	NAQC	STU	NAHE
4	NAHE	STU	ACGU	ACGU	NAHE	ACGU	ACGU	ACGU
5	ACGU	ACGU	NAHE	NAHE	ACGU	NAHE	NAHE	ACTU

4.2 Critical Success Factor – Leadership

Leadership as one of the eight CSFs is presented here as an example of sustainable quality performance. In the HE sector the influence of the leadership depends on its relationship with staff and various sub – systems of the organisation (Assare, 2007). These relationships are grouped into leadership involvement, leadership commitment and leadership awareness; six QAPs listed in Table 4 relating to these aspects are LD1, LD2, LD4, LD5, LD6, and LD7. In addition three additional QAPs deal with implementation of management systems, ability to take timely decisions and inspiring people (Table 4). Statistical test results pertaining to these QAPs are presented in Tables 4 and 5 and Figure 1. Table 4 presents the Kruskal Wallis statistics for institution, faculty, qualification and age groups (more than two groups each) followed by Group Average of each QAP (GAQ), rank of the GAQ within the leadership CSF and Sustainability Index (SI). Table 4 also presents the Mann Whitney statistics for gender and location groups (two groups each) and Figure 1 summarises Tables 4 and 5 by showing groups that have high or low scores for the largest number of QAPs.

Table 4. High and low scores of Kruskal-Wallis Mean Ranks (KWMR) and probability levels of significance for various QAPs under Leadership CSF (\* indicates p <= 0.05 and \*\* indicates p<=0.005)

QAP No.	CATEGORY >> Question on the QAP	INSTITUTION			FACULTY			QUALIFICATION			AGE			GAQ / Rank	Sustainability
		GROUP / KWMR		P	GROUP / KWMR		P	GROUP / KWMR		P	GROUP / KWMR		P		
		High	Low		High	Low		High	Low		High	Low			
LD1	Leadership involvement in the development of a strategic statement about the purpose, direction, and culture of the organization is high	ACGU 355.2	NAHE 306.0	0.347	DENT 330.0	SCI 229.1	0.023	MAS 333.9	OTH 335.5	.604	MID2 347.9	SEN1 234.0	.600	1.73 / 9	0.347
LD2	Leadership involvement with customers, suppliers and society, towards promoting partnerships & improvements is high	NAHE 387.5	ACGU 297.5	0.000**	DENT 343.4	PHAR 210.4	.000**	MAS 304.3	OTH 353.6	.001**	MID1 366.6	SEN1 152.0	.000**	2.18 / 5	0.458
LD3	Senior management implements quality management systems that improve organizational performance	STU 355.0	NAQC 318.5	0.849	DENT 320.1	ECON 229.0	.013	MAS 344.8	OTH 319.3	.146	MID2 361.8	SEN1 197.3	.150	1.91 / 8	0.387

Table 5. High and low scores of Mann Whitney Mean Ranks (MWMR) and probability levels of significance for various QAPs under Leadership CSF (\* indicates p <= 0.05 and p<=0.005) \*\* indicates

QAP No.	CATEGORY >> Question on the QAP	GENDER			LOCATION		
		GROUP / MWMR		P	GROUP / MWMR		P
		High	Low		High	Low	
LD1	Leadership involvement in the development of a strategic statement about the purpose, direction, and culture of the organization is high	M 344.9	F 326.9	.218	G HAR 343.0	TRIP 337.0	.0657
LD2	Leadership involvement with customers, suppliers and society, towards promoting partnerships & improvements is high	M 341.3	F 335.3	.691	TRIP 364.0	G HAR 306.0	.000**
LD3	Senior management implements quality management systems that improve organizational performance	M 348.4	F 318.7	.045*	TRIP 341.0	G HAR 337.6	.810



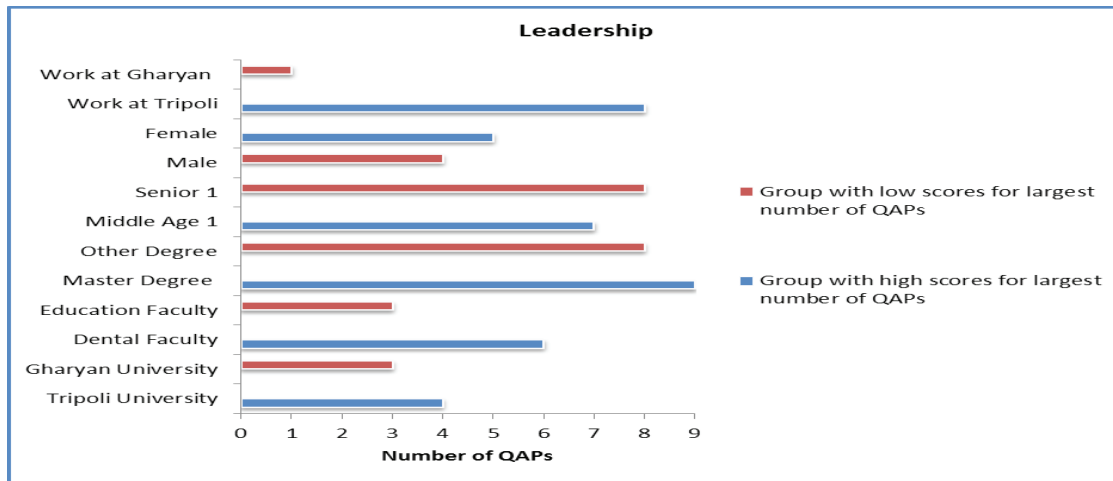


Fig. 1. Largest number of QAPs for which different groups have scored high or low KWMR (or MWMR) under Leadership CSF

Tripoli University has a high KWMR for four QAPs; these include: leadership commitment to continuous improvement, quality training, sound and timely decisions of the leadership and creation of a culture of involvement among the stakeholders. In most cases KWMR results are low for Gharyan University. According to the interview responses Tripoli University has been a mainstream academic institution for a long time and reputed for its quality orientation to academic activities. The education quality management staff of this university engages in collaborative activities with the national Quality Centre; this is supported by its location in the capital city of Tripoli which favours participation in international conferences and workshops and enhances their knowledge on quality matters, although with the recent trouble in Libya this activity may have waned.

The low scores of Gharyan University on leadership QAPs can be attributed to the fact that it is a regional level institution that caters to the education needs of the region south of Tripoli city which means that the faculty members are less qualified and there is a lack of participation in quality collaboration. This university was established much later than Tripoli University and often follows quality procedures communicated from national level agencies such as the Quality Centre and the Higher Education Secretariat at the Ministry. In the context of SQM this study found that the level of quality consciousness in this university is only slowly emerging with the leadership QAPs LD2 (leadership involvement with various stakeholders), LD4 (leadership commitment to continuous improvement) and LD8 (leadership ability to take timely decisions) requiring further development at this university. For LD4 (continuous improvement through leadership) a high KWMR score was observed in Tripoli University compared to the Quality Centre and HE Secretariat, which are supposed to practice their own continuous improvement programs in a professional manner.

Based on the interviews it was found that senior management needs to attend training programs to gain more insight into quality and sustainability issues. A director at the Quality Centre offered an additional explanation stating that appointments are often based on political affiliation and government loyalty rather than qualifications and professional experience.

4.3 Overall performance of faculty groups

Law, dental and education faculties scored well in the CSFs; economics and engineering faculties are found in the middle ranks and the remaining faculties in the lower ranks. It is reasoned that dental and law faculties are older than the other faculties and they have developed quality procedures and processes to some extent. Moreover, some of the staff in these two faculties are also engaged in the Quality Centre and these faculties have better access to financial resources compared to other faculties.

4.4 Overall observation of other groups relating to leadership

In general, young and middle age respondents had a higher GAC ranking than the older respondents. Interview responses have shown that this is related to the experience factor for those in middle age and the exposure factor for the young. The middle age are likely to have more experience on quality and sustainability matters and young respondents are exposed to modern internet based information systems and are thus aware of the complex issues related to sustainability.

Those working in Tripoli attained a higher frequency in the high ranks for GAC. In reference to age most staff and faculty members at the Tripoli University are in the middle age group and thus have knowledge and awareness in education quality matters. Moreover, some of them participate in quality assurance centre activities that are related to quality management.

In reference to qualification, those with a Master's level education scored the highest GAC, they were the highest rank for Leadership, Policy and Strategy, Continuous Improvement and Process Management (See Table 3). In terms of gender, females were found to have the highest GAC.

The statistical tests were followed by an analysis of background information gathered about the respondents involved in the questionnaire survey. Subsequently, a combined quantitative and qualitative analysis, achieved through triangulation modelling, were presented under eight sub - sections corresponding to eight CSFs chosen for the study.

4.5 Sustainability Evaluation

Findings of this study revealed a low Sustainability Index level characterised by exploitation of natural resources. Libyan higher education experts agree that the increase in student enrolment has led to such exploitation; however, the study also revealed that enrolment should not be a valid reason for weak sustainability.

#### 4.6 Green Campus Agenda

Although there was support for leadership awareness of biodiversity and efficient use of natural resources among all stakeholder groups and that leadership acknowledges the need for trained and qualified staff in this area, the “green campus” sustainability concept is not properly understood or implemented by leadership. Sustainability policy has already been developed by UK Universities but little work has been reported by the Libyan HE institutions. In order to achieve the optimal exploitation of natural resources stakeholders should participate in environmental issues and solutions and implementation of SQM

#### 4.7 Social Justice and Transparency

Tripoli University scored high in this area; however, Gharyan University received a low score. According to the Director of Gharyan University senior management should address the weaknesses of transparency in finance allocation for development of resources and there is a need for transparency in the development and application of policies.

#### 4.8 Reward system

This is not commonly observed in the Libyan higher education system but is practiced in some other Arab countries. Interestingly, a reward system was among the a few QAPs for which Gharyan University scored high, but the student group scored low indicating that the reward system at this university is not matching student expectations or is limited to staff members.

#### 4.9 TBL in financial process

The Quality Centre scored low for the TBL principle of including environmental and ethical issues in financial processes, indicating a low awareness on sustainability orientation.

#### 4.10 Creativity, Innovation and Sustainability

Although Libyan universities have introduced many innovations to improve teaching – learning processes, creativity and innovation are lacking in the curriculum and examination systems. This confirms previous studies conducted at secondary level education.

#### 4.11 Implementation of stakeholder approaches

While Tripoli University has scored high for this QAP, the Higher Education Secretariat scored low indicating the need for enhancing stakeholder approaches at the national level. However awareness on this issue is among Libyan higher education leaders is significant and this is supported by overall high ranks in the People Focus CSF.

#### 4.12 Barriers to continuous improvement

Several barriers identified to academic improvements include lack of books and references, indoctrination during study, lack of freedom of opinion for students during the lectures, students unable to attend seminars and courses related to specialisations, lack of encouragement from teachers, the use of examinations to threaten students, lack of extra - curricular activities, inability of some teachers to deliver lectures, repetition of topics during lectures, ignorance of study regulations and frequent absenteeism of professors.

### 5. Conclusion

This study has highlighted the potential for integrating sustainability and quality management models within higher education to generate an approach to Sustainable Quality Management (SQM). It has combined qualitative and quantitative data to assess how the key factors within SQM perform in a Libyan context; due to space issues the analysis presented was restricted to Leadership. The study aimed to develop a framework for SQM in Libyan HE through a combined quantitative and qualitative analysis of the current understanding of the critical success factors of SQM within five Libyan institutions. Quantitative data was gathered and analysed statistically and qualitative data was interpreted using key word content analysis. Summaries were prepared across groups and CSFs based on group average scores and correlation matrices, high and low observations were discussed and reasons for the differences in perceptions were explored. From this a synergetic framework based on quality and sustainability for the Libyan HE system was developed. The study found that overall there was lack of understanding and implementation of SQM in the Libyan HE system and leadership was found to be a main factor in this failing. Although there was variable leadership support for continuous improvement, biodiversity and the efficient use of natural resources the effective implementation of these initiatives was often lacking.

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## OFP-013

**E-Commerce Service Quality and Loyalty in Malaysia Hotel Industries**

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**Abstract**

E-commerce had expanded the business into a global environment and plays a critical role in managing business strategically including in the hotel industries. E-commerce has the potential to design according to the different types of organizations in various industries, including the hotel industries. The tourism industry is the largest industry-based services. E-commerce can provide a unique application in the tourism industry in general and especially the hotel sector to further develop the services provided. Managing customer loyalty as a result of the use of E-commerce service quality in the long term is very important in view of the increase in the number of foreign tourists of Malaysia. Commonly, service quality is defined as the level of the delivered service level meets the customer expectation. Therefore, in terms of E-commerce, service quality is whether the service provided by the hotel website meets the expectation of E-commerce customer or not. This paper discusses about the E-commerce service quality and tourist loyalty in Malaysia East Coast hotel industries. Towards a comprehensive understanding of E-commerce service quality amongst foreign tourist in Malaysia East Coast hotel industries, quantitative research using a questionnaire as a research instrument was adopted. The preliminary survey has identified that E-commerce service quality are influenced by the perceived user interface quality, perceived product, perceived security risk, and perceived privacy. When the hotel industry successfully provided E-commerce service quality, loyal customers will be formed. The findings generated from selected foreign tourists in Malaysia East Coast hotel industries reveal the preliminary survey. All the identified factors or aspects were further included in the main survey towards improvement of E-commerce service quality in Malaysia hotel industries. At the end, this study is expected to help hotel industries to improve their E-commerce service quality, which in turn will produce E-customer loyalty in Malaysia and also in Asia.

**1. Introduction**

The rapid global growth in E-commerce had an increased business competitive advantage by using E-commerce to interact with customers and to deliver value. Businesses that have experienced in using E-commerce begin to realize that web site presence and low price is not merely the key determinants of success or failure, but also include the E-commerce service quality (Yang, 2001; Zeithaml, 2002). Santos (2003) defined E-commerce service quality as the assessment and judgment of the customers regarding the E-service delivery in the virtual marketplace. A business will not be able to deliver the appropriate level of service quality to satisfy its customers without a quality management approach that guarantees quality of its system.

E-customer loyalty is costly and difficult to achieve (van Riel *et al.*, 2001), and in order to achieve that, it requires a quality service that satisfies the customer. In any industry, the key factor in gaining a competitive advantage over the competition is the customer loyalty. Parasuraman *et al.* (1991) found that, through service experiences, customer place a great deal of importance on relationships. E-businesses are executing customer retention techniques by building up this kind of customer relationship which should result in increased customer loyalty and business development (Heskett *et al.*, 1994).

There are empirical studies such as Zeithaml *et al.* (2005) and Park and Kim, (2003), which was discussed on E-commerce service quality, but the studies in the Malaysia hotel industry is really limited. This research will be a pioneer research that will determine the dimensions of E-commerce service quality in Malaysia East Coast hotel industries since no accepted framework has been established in the Malaysian hotel industries. In this research, the framework developed will be tailored to the E-commerce service in Malaysian hotel industries and hence will develop E-customer loyalty.

**2. Literature Review**

The studies on E-commerce service quality had begun in early 1984. According to Cronin and Taylor (1992), service quality is hard to explain and measure because it is an elusive and abstract construct. That is the reason why many models had been developed on service quality.

In this study, the main studies on E-commerce service quality has been reviewed from 16 researchers. All these main studies are adopting and adapted to the Malaysian hotel industry. The dimensions that are related and suitable to measure the E-commerce service quality in the Malaysian hotel industry had been chosen to create this research and we had chosen Mustafa as our main reference. We choose this research because this research is the latest and its dimensions is suitable for Malaysian hotel industry. Table 1 shows the reviews of these 16 researchers.

Table 1. Summary of main studies on E-commerce service quality review

Authors (year)	Model	Dimensions
Gronroos (1984)	CPQ	Measures consumer's expectation of service compared with the customer's perception of the service actually received
Parasuraman <i>et al.</i> (1985)	SERVQUAL	<ol style="list-style-type: none"> <li>1. Reliability</li> <li>2. Responsiveness</li> <li>3. Assurance</li> <li>4. Empathy</li> <li>5. Tangibles</li> </ol>
Davis (1989)	TAM	<ol style="list-style-type: none"> <li>1. Perceived usefulness</li> <li>2. Perceived ease of use</li> </ol>
Delone and McLean (1992)	IS success	<ol style="list-style-type: none"> <li>1. System quality</li> <li>2. Information quality</li> <li>3. Use</li> <li>4. User satisfaction</li> <li>5. Individual impact</li> <li>6. Organizational impact</li> </ol>
Liu and Arnett (2000)		<ol style="list-style-type: none"> <li>1. Quality of Information</li> <li>2. Service</li> <li>3. Security</li> <li>4. Playfulness perceived by consumers</li> </ol>
Yoo and Donthu (2001)	SITEQUAL	<ol style="list-style-type: none"> <li>1. Esthetic competitive value</li> <li>2. Ease of use</li> <li>3. Design</li> <li>4. Ease of ordering</li> <li>5. Corporate and brand equity</li> <li>6. Processing speed</li> <li>7. Security</li> <li>8. Product uniqueness</li> <li>9. Product quality assurance</li> </ol>
Barnes and Vidgen (2002)	Web site quality scale	<ol style="list-style-type: none"> <li>1. Usability of web site</li> <li>2. Information quality</li> <li>3. Interaction between customer and web site</li> </ol>
Loiacono (2002)	WebQual (TM)	<ol style="list-style-type: none"> <li>1. Information fit-to-task</li> <li>2. Interactivity</li> <li>3. Trust</li> <li>4. Visual appeal</li> <li>5. Innovativeness</li> <li>6. Flow/emotional appeal</li> <li>7. Design appeal</li> <li>8. Intuitiveness</li> <li>9. Response time</li> <li>10. Integrated communications</li> <li>11. Business process</li> <li>12. Viable substitute</li> </ol>
Schubert and Dettling (2002)		<ol style="list-style-type: none"> <li>1. Ease of use</li> <li>2. Usefulness and trust</li> <li>3. Use of the extend web assessment method as a tool</li> </ol>
Wolfenbarger eTailQ and Gilly (2003) eTailQ		<ol style="list-style-type: none"> <li>1. Web site design</li> <li>2. Reliability</li> <li>3. Privacy/security</li> <li>4. Customer service</li> </ol>
Park and Kim (2003)		<ol style="list-style-type: none"> <li>1. Information quality</li> <li>2. User interface quality</li> <li>3. Security perception</li> </ol>
Yang <i>et al.</i> (2004)		<ol style="list-style-type: none"> <li>1. Usability</li> <li>2. Usefulness</li> <li>3. Adequacy of information</li> <li>4. Accessibility</li> <li>5. Interaction</li> </ol>
Lee and Lin (2005)	Revised SERVQUAL	<ol style="list-style-type: none"> <li>1. Web site design</li> <li>2. Reliability</li> <li>3. Responsiveness</li> <li>4. Trust</li> <li>5. Personalization</li> </ol>
Zeithaml <i>et al.</i> (2005)	E-S-QUAL	<ol style="list-style-type: none"> <li>1. Routine service encounters</li> <li>2. An auxiliary scale for service errors</li> <li>6. Web site design</li> </ol>

Ho & Lee (2007)	Evaluation of travel service website quality	<ol style="list-style-type: none"> <li>1. Information quality</li> <li>2. Security</li> <li>3. Ease of use</li> <li>4. Availability</li> <li>5. Customization</li> <li>6. Community</li> <li>7. Responsiveness</li> <li>8. Delivery fulfillment.</li> </ol>
Mustafa I. Eid (2011)	E-commerce service quality	<ol style="list-style-type: none"> <li>1. Perceived user interface quality</li> <li>2. Perceived information quality</li> <li>3. Perceived privacy</li> <li>4. Perceived security risk</li> </ol>

**3. Methodology**

This research employed a quantitative study method and using questionnaires as a research instrument. The sampling were 100 tourists staying in hotels and resorts above three (3) stars on the East Coast of Peninsular Malaysia. This student chooses the hotel industry because the industry is growing rapidly in Malaysia. Studies involving the hotel industry in Malaysia are still slightly in determining the quality of E-commerce service quality, thus creating E-customer loyalty. E-commerce service quality were measured by using 18 items and by using a Likert scale of 1 to 10, with 1 being “strongly disagree” and 10 being “strongly agree”. It involves four dimensions, including perceived user interface quality, perceived product, perceived security risk and perceived privacy

In order to complete the data analysis, the Statistical Packaging for Social Science (SPSS) version 20 was used. After the data had been collected, the data set will be checked by the normality test. To check the normality of the data set, only a measure of skewness will be used in this study. When the measure of skewness is 0.0, the data are perfectly distributed, but it also considered normally distributed when the measure between (-1.0) and 1.0 (Zainuddin, 2010). Reliability analysis is the second statistical technique used and Cronbach’s alpha is the popular measure of reliability. Nunally (1978) recommended that, the minimum value of Cronbach’s alpha that will reflect the measuring factors is 0.6.

**4. Findings and Discussions**

This preliminary study had 100% response rate. Table 2 presented the results for each element in the preliminary study. From the table, the skewness of perceived user interface quality was (-0.19). The skewness of perceived product was (-0.40), perceived security risk (0.01) and perceived privacy was (-0.22). The measure of skewness between (-1.0) and 1.0 is considered as normally distributed. Therefore, this result of the normality test can be considered as normally distributed and further analysis can be proceed.

Table 2. Summary of the result of normality test

Element	No. of Sample	Minimum Score	Maximum Score	Mean	Std. Error	Std. Deviation	Skewness
Perceived user interface quality	100	4.75	10.0	7.3950	0.11850	1.18502	-0.191
Perceived product	100	5.00	9.80	7.5420	0.11896	1.18962	-0.400
Perceived security risk	100	5.00	10.0	7.4275	0.12233	1.22335	0.010
Perceived privacy	100	4.80	10.0	7.4880	0.11534	1.15341	-0.222

As illustrated in Table 3, the Cronbach’s alpha for perceived user interface quality comprises of four items was 0.89. The coefficient reliability of perceived product which comprises of five items was 0.86 while the perceived security risk which comprises four items was 0.89. The Cronbach’s alpha for perceived privacy factor comprises of five items was 0.88. According to Nunally (1978), the minimum value of reliability measure is 0.6. Therefore, all factors in this preliminary study have provided a reliable measure of internal consistency since all reliability measure have exceeded the minimum value of 0.6.

Table 3. Summary of the result of reliability statistics

Element	Number of items in an element	Cronbach’s Alpha
Perceived user interface quality	4	0.89
Perceived product	5	0.86
Perceived security risk	4	0.89
Perceived privacy	5	0.88

Based on this preliminary study, the findings generated from foreign tourists staying in hotels and resorts above three (3) stars on the East Coast of Peninsular Malaysia reveal that the dimensions to measure E-commerce service quality perceive user interface quality, perceived product, perceived security risk and perceived privacy. This data set can be used to conduct further study in the main survey.

## 5. Conclusion

This paper sets out the dimensions to measure E-commerce service quality that will lead to E-customer loyalty. The dimensions that are suitable for Malaysia hotel industry had been chosen for the review of main studies in E-commerce service quality from 16 researchers. The sampling, where 100 foreign tourists were randomly selected from hotels and resorts above three (3) stars on the East Coast of Peninsular Malaysia.

From the normality test and reliability statistics that we had gotten from the preliminary survey results, the dimensions that had been chosen can be accepted and adapted to the Malaysia hotel industry. When hotel industry can fulfill all the factors of E-commerce service quality, which are perceived user interface quality, perceived product, perceived security risk and perceived privacy, the E-customer loyalty can be developed. These dimensions of E-commerce service quality in the hotel industry have not been explored by any other researcher in Malaysia and therefore, this study will contribute to the development of hotel industry and also tourism industry in the future. After the study is concluded, it is expected to help hotel industries to improve their E-commerce service quality, which in turn will produce E-customer loyalty in Malaysia and also in Asia.

## Acknowledgement

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OFP-014

## The Effect of Organizational Creativity on Team Performance by Mediating Role of Self Organization and Team Perception in SMEs, Public and Private Sector

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### Abstract

Self evaluation of the employees and teams do not just support to increase their knowledge about their work; but also make them produce creative ideas indirectly through increasing their intrinsic motivation. Results of the empirical surveys show that working environment and intrinsic motivation have mediation effects on the relationship between the creativity of the employees and teams with their performance. Previous studies remark that self evaluation of the employees has positive effects on company and small firm (SME's) performance; but creativity is another part of the company performance and the influences on company performance and creativity are different. This study, aim of which is to understand the mediating factors in the positive effects of creativity on company performance includes theoretical and empirical findings. Results of the study reveal that team perception and self organization have different mediating effects in the relationship between creativity and team performance. There are strong and positive relationships between organizational creativity and team perception and self-organization. These variables also affect team performance in the organizations positively. The positive effect of organizational creativity on team performance and self-organization reflect to the team performance positively.

### 1. Introduction

Creativity and innovation are very important to achieve successful performance results in the companies. Even there is a common view about the effects of the environment to increase creativity; there are limited studies about the companies how to use their strategic human resource management (HRM) for this purpose. Strategic HRM, as planned human resource (HR) practices to achieve organizational targets, have the power to direct employees' attitudes and behaviours to create influences about the environment. So the studies about the influences on the employees' creativity of the strategic or non-strategic HRM should be done. High commitment work systems (HCWS) are the systems that create employee commitment and includes the HRM practices like employee participation, inside promotion, team rewarding, profit sharing, training and gain and job security (Chang et al., 2014: 666).

### 2. Creativity and Team Perception

Team creativity is to improve valuable and practical new product, service, opinion, procedure or processes by the individuals working together in a complex social system. Task complexity is special to low routine, depending on high cognitive accumulation and including ambiguity type of works and this concept is frequently mentioned in labor relations, social capital and creativity literatures. Social capital literature also assumes complex task environment basically. When the tasks are easy; the correlation between labor- organization relations and team creativity will be poor in terms of the improvement of the social capital (Jia et al., 2014: 873-875).

Task complexity is also defined as how a task needs a cognitive context, problem solving and technique knowledge. When the tasks are complex and the organizations highly invest in HCWS; creativity of the employees will increase as they will have job motivation to produce competencies about their works, creative competencies and new ideas while solving difficult problems (Chang et al., 2014: 670).

Self evaluation of the employees does not just provide the employees to reach more knowledge about their works, but also helps to improve creative ideas in their working area indirectly through increasing their intrinsic motivation (Chiang et al., 2014). Although most studies show that the different views of the group members produce radical results in idea creation; Harvey (2014) suggests a dialectic model that the sum of the views of the team members produce creative results.

According to Edmand Phelps, who won the Nobel Prize in economics in 2006; modern economic growth is an indirect result of human creativity and enlightened politics should be applied as feeding and improving this creativity. In that way also the satisfaction of the human being is increasing (Godley, 2014: 255).

### 3. Self Organization and Team Performance

As the factors of the team climate; vision, participation confidentiality, work definition and supporting innovation are very important to improve creativity. Vision should be clarified, valuable and accepted by the team members; team members should feel that they can present new ideas and solution suggestions without judged or criticised confidentially; there should be a task complexity which is emphasized and carefully discussed and several solutions are presented; also the team members should feel that innovation is supported. If the tasks provide using and learning several skills; definable; create important effects for the others and provide working on her/ his own and feedback then this means these tasks have high complexity. Skill variety, importance of the task, job description, royalty and feedback are the preliminary conditions for creativity about work (Anderson et al., 2014).

Self trust, self efficacy, emotional consistency and being controlled are the building stones of self evaluation as individual value and skills. Self evaluation is also relevant to individual satisfaction, initiative and popularity. Emotional consistency is being calm. Being controlled is the belief that the wanted results are achieved through own behaviours rather than the external factors (Chiang et al., 2014: 1405-1406).

While complex tasks under one's self control aim creative results by encouraging the employees to focus on different dimensions of the work at the same time; simple and routine tasks do not aim such results. When individuals feel integrated to their work inherently; all their cares and efforts are concentrated on their works. So this leads them to have a highly creative structure by being more insistent and choosing between different alternatives (Joo et al., 2014: 301).



### 3.1. Self Management

Self management is on the agenda of organizational scholars and managers as newly emerging organizational designs demand self directed working behaviour. Self management is composed of three practices, which are: goal setting, monitoring the behaviours against these goals and operating on her/his self and the environment to reach these goals (Renn et al., 2011: 25).

Self regulation theories stress on goal selection and goal pursuit. These components are also establishing self management. Self management strategies are analysed on three levels, which are general, domain-specific and career-specific (Abele and Wiese, 2008: 734-735). The goals of self management are cost reduction and control of complex operations (Carofoglio et al., 2010: 177).

### 3.2. Adaptive Organization

Organizational survival depends on adaptation; so people have to will to change. Survival is observing the whole picture, not just the experiences to create an adaptive organization. All companies face uncertainty and chaos, so organizational goals and actions should be reexamined. Ignoring the rules and keeping adaptability is the key for survival in today's ambiguous working environment (Bedison, 2004: 761).

Organization as a complex adaptive system, which has to deliver rapid and qualified responses to the social, media-related and technological improvements in the working environment is linked to effective knowledge management in the organizations (Shoham and Hasgall, 2005: 225).

Type of a natural selection, the companies which adapt the changes survive. So adaptive organization is one step beyond the learning organization in the evolution of the organizations (Stephanus, 1997: 65).

## 4. Research Methodology

The studies about the impacts of organizational creativity on teams and organizations are limited in the literature. In our survey we used questionnaire method to the convenient sampled 278 employees in Istanbul. A Likert type scale was presented to the respondents that would allow them to conduct evaluations regarding each entry. (1 = totally disagree, 5 = totally agree). Demographic analysis for the findings, factor and reliability tests and regression analyses were performed with SPSS 18.0 statistical software package.

The inventory of survey are "Organizational Creativity" scale from Çavuş (2006), "Self Organization" scale from Vergiliel (2000), "Team Perception" from Atulgan et al. (2010) and "Team Performance" from Weimar (2013).

Factor analysis towards findings and progressive intermediary variable tests are carried out by verifying different models. For the purpose of determining the intermediation roles of the intermediary variables, three-step method proposed by Baron and Kenny (1986) was adapted to our research.

### 4.1. Hypotheses

**H1.** According to organizational creativity, self-organization, team perception and team performance, there are significant difference between public and private sector.

**H2.** According to organizational creativity, self-organization, team perception and team performance, there are significant difference between small and large firms.

**H3.** There is a strong positive relationship between organizational creativity, self-organization, team perception and team performance.

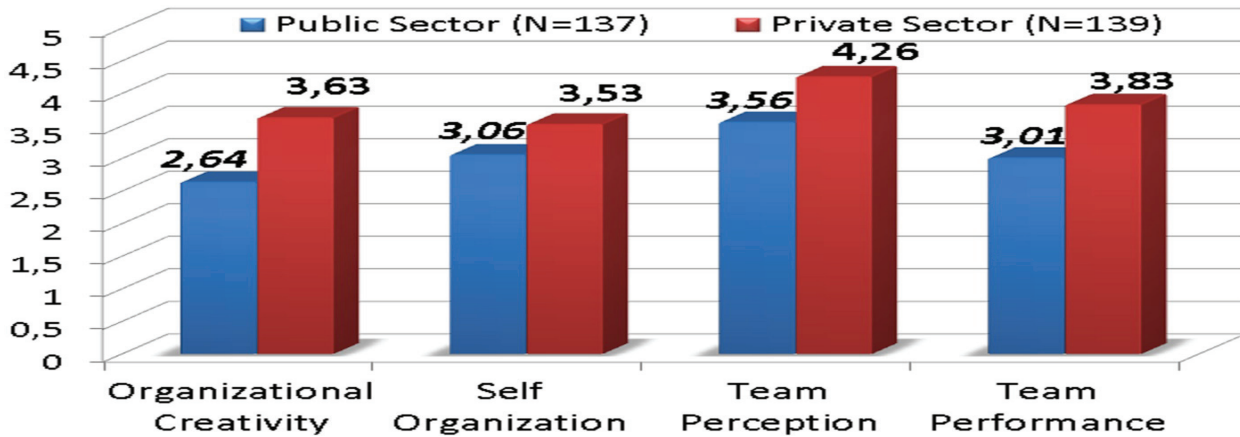
**H4.** Self-organization and team perception will function as mediating variables between organizational creativity and team performance.

### 4.2. Findings

Demographic characteristics of the sample used in this study are as follows: 51% of female respondents and 49% of males and the mean age was 36. Of 81% bachelor's degree and the remaining 19% portion of the participants were the elementary, middle school and high school graduates. The average working time among the participants was approximately 8 years in this business, and they have been in working life for an average of 15 years.

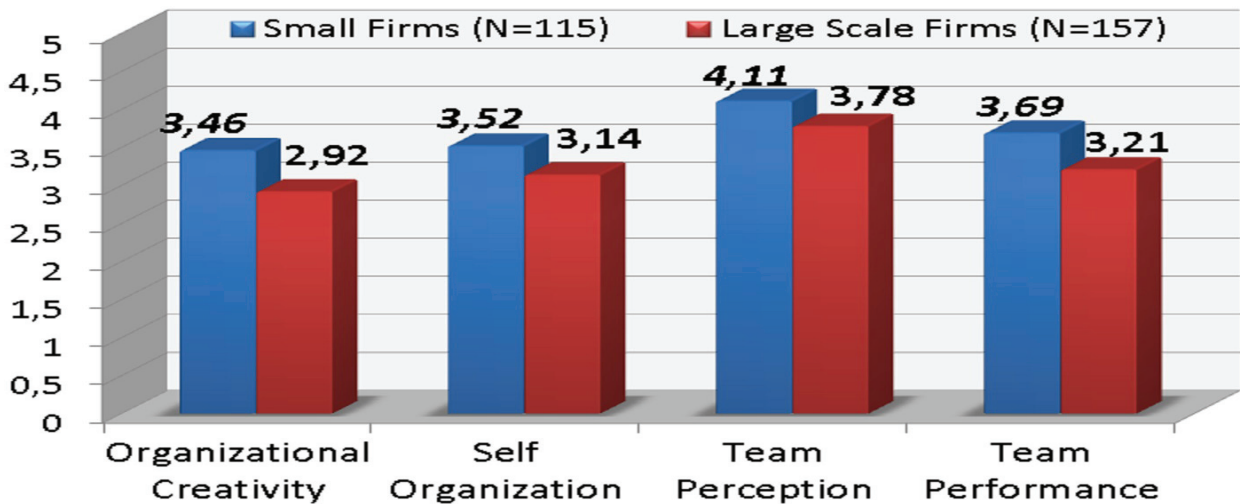
In order to determine the sub-dimensions of our variables, with varimax torsion in SPSS, exploratory (descriptive) factor and internal consistency analyses were performed. Each scale was run through the factor analysis separately, and their reliability was tested with Cronbach's alpha values, and the scales were translated in the following tables. Cronbach's alpha reliability coefficients of the scales were 0.70 and higher, therefore the scales were found to be reliable. Explanatory factor value for self-organization which is composed of two factors as self-management and adaptive organization is %72.

Our first hypothesis is supported with the difference analyses statistically significant with 0,001 between public and private sector (Graph 1). Organizational creativity ( $t=-6,898$ ;  $p=0.000$ ), self-organization ( $t=-6,733$ ;  $p=0.000$ ), team perception ( $t=-6,569$ ;  $p=0.000$ ) and team performance ( $t=-5,112$ ;  $p=0.000$ ) are in different perception levels for public and private sector.



Graph 1: The Difference Between Private-Public Sectors

Our second hypothesis is supported with the difference analyses statistically significant with 0,01 between small and large firms (Graph 2). Organizational creativity ( $t=3,357$ ;  $p=0.001$ ), self-organization ( $t=3,820$ ;  $p=0.000$ ), team perception ( $t=2,839$ ;  $p=0.000$ ) and team performance ( $t=3,546$ ;  $p=0.000$ ) are in different perception levels for small and large firms.



Graph 2: The Difference Between Small and Large Firms

According to Pearson’s correlation coefficients, our third hypothesis is also supported (Table 1). A high positive correlation was found between organizational creativity, self-organization, team perception and team performance.

Table 1: Correlations Between Variables, Variable Averages, Standard Deviations and Their Relationships

Variables	Mean	S.d.	1	2	3	4
1. Organizational Creativity	3,13	1,29	(.98)			
2. Self-Organization	3,30	0,81	,67**	(.92)		
3. Team Perception	3,91	0,93	,79**	,59**	(.87)	
4. Team Performance	3,42	1,11	,81**	,61**	,74**	(.96)

All correlations are significant at \* $p < 0.05$  and \*\* $p < 0.01$ ,  $n=278$

Progressive intermediary variable tests towards the team performance are performed with verification of different models with SPSS (Table 2).

Organizational creativity increase the effectiveness of self-organization (model 1), team perception (model 2) and team performance (model 4). Self-organization is also effective on team perception (model 3) and team performance (model 5). Team perception has also positive effect on team performance (model 6), it is also partially mediating between self-organization and team performance. Our fourth hypothesis was partially supported (table 2).

Table 2: Impact of Organizational Creativity, Self-Organization and Team Perception on Team Performance

	Dependent Variables					
	Self-Organization	Team Perception			Team Performance	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Organizational Creativity	.418*** (.028)	.570*** (.026)	.523*** (.035)	.698*** (.030)	.627*** (.040)	.456*** (.052)
Self-Organization			.114* (.056)		.171** (.065)	.133* (.063)
Team Perception						.327*** (.067)
<i>Adjusted R<sup>2</sup></i>	.443	.628	.633	.654	.662	.688
<i>F</i>	221,471***	469,565***	239,501***	525,550***	271,950***	204,526***

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$  significant value, standard errors in parentheses

### 5. Conclusion

Creativity and innovation are very important to achieve successful performance results in the small private enterprises. Private sector and small firm practices about organizational creativity, self-organization, team perception and team performance are higher than public sector and large firm employees' in Turkey. There are strong and positive relationships between organizational creativity and team perception and self-organization. These variables also affect team performance in the organizations positively. The positive effect of organizational creativity on team performance and self-organization reflect to the team performance positively. Organizational creativity, self-organization, team perception have direct positive effects on team performance. We suggest the public sector and large firm managers in Turkey, in order to increase their employees' involvement and encourage creativity in their organizations; they should use teams effectively, so they can increase team performance.

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## OFP-015

**Uncertainty Amidst Change; Impact of Privatization on Employment Opportunities in Pakistan**Ahmed Muneeb Mehta<sup>a</sup>, Ali Irshad<sup>b</sup>, Imran Hashmi<sup>b</sup>*Yasar University, Izmir, Turkey**Independent Researcher, Lahore, Pakistan***Abstract**

This empirical study evaluates the impact of privatization on employment opportunities in Pakistan. It also intends to examine the relationship among competition, innovation and investment with employment opportunity because privatization leads to competition, investment and innovation in the organization. The problem is that privatization not always increases employment opportunities because literature shows both positive and negative effects of privatization on the organization structure as well as on the economy. In line with the requirements of the research, descriptive statistics have been used with the help of a cross-sectional survey. Research design will be descriptive type of study. The results of this paper shows that there is positive relationship between privatization and employment by injecting new investment, introducing better management, improving competitiveness, and leaving more money in the hands of the public, is likely to result in increased employment opportunities.

**1. Introduction**

This study tends to analyze the impact of privatization on the economic conditions of Pakistan. In the recent past Pakistan went through some economic problems and the whole world was. In addition to this, privatization has also been a common feature of Pakistan in the last few years. Impact of privatization is important for Pakistan because the country facing many crises and privatization plays an important role in this case. Both, the economy and state of Pakistan are in crisis. Pakistan has not faced a crisis of this level in its entire 50-year history (Burki, 2000).

“Privatization is the incidence or process of transferring ownership of a business, enterprise, agency, public service or property from the public sector (the state or government) to the private sector (businesses that operate for a private profit) or to private non-profit organizations” (Wikipedia, 2008). Privatization refers to the five different crises that have combined to create this situation. These are: the global financial crisis, Pakistan’s short-term liquidity problem, economy’s structural weaknesses, strict social backwardness, and, finally, the crisis of governance. Several solutions to the problems and privatization are one of the ways to restructure the economy and improve the quality of governance (Burki, 2000).

“Privatization is transaction by virtue of which any property, right, interest, concession or management thereof is transferred to any person from the Federal Government or any enterprise owned or controlled, wholly or partially, directly or indirectly, by the Federal Government” (Khan, 2003). This paper aims to access the impact of privatization on employment in Pakistan. The concept of privatization is not new to the policy makers of this country. It may be traced as back as in 50s, when Pakistan Industrial Development Corporation (PIDC) was established in 1952 to increase the industrial development in the country (Bokhari, 1998). This Premier Corporation established over 50 industrial undertakings in the length and size of the country and after their successful operation and management; these units were transferred from the public to the private sector. The tide of nationalization, which swept the whole economy in the first half of 70s, was reversed in 1977. The privatization of State Owned Enterprises (SOE) became an important instrument of economic policy of the government in late 80s. However, it was in 1991 that privatization process in Pakistan became effective (Bokhari, 1998).

“At present, as many as 46 industrial units including all the remaining manufacturing units with the exclusion of Pakistan Steel have been placed on the privatization list. Furthermore, two banks and six non-bank financial institutions; four units in the oil and gas sector; Karachi Electric Supply Corporation; six thermal power units and three area electricity boards of Wapda; Pakistan Telecommunications; Pakistan Shipping Corporation and National Tanker Corporation; and Pakistan Railways are also on the privatization list” (Kemal, 1991).

Privatization will support credit creation which will be helpful in rapid economic growth of Pakistan. “Property rights lead to increase investment since people are confident and safe about the ownership of their property by creating strong incentives” (Filipovic, 2005). Privatization open the new opportunities for the private investors in the economy and increase the FDI but privatization has not always has a positive results for the economy. However, “the proof that is available on the employment effects of privatization does not appear to confirm a significant decrease in employment levels as a result of privatization. Studies point out that employment levels in the privatized enterprises have either been maintained or increased” (Cheng, 2007).

A legal structure and effective organization to carry out the task is the basic requirement of privatization programme (Mehdi, 1991). So this paper aims to see the impact of privatization on employment level in Pakistan and to see the relationship of competition, innovation and investment with employment opportunity in this study because the privatization leads to competition, innovation and investment in the economy so in this regards this paper will analyze the relationship among these variable with the employment level in Pakistan.

**2. Literature Review And Hypotheses****2.1 Literature Review**

The privatization of State Owned Enterprises (SOE) became an important mechanism of economic policy of the government in late 80s. However, it was in 1991 that privatization process in Pakistan became valuable” (Bokhari, 1998). “Privatization should happen where it has the most promise of adding to productive efficiency and economic growth” (Kemal, 1991). Most peoples fear related to this privatization because public employees believe that if privatization occur then chance of job losses, lower wages, less benefits, a changed work environment and conditions, more workloads, moving to

a new location, different schedules, new bosses, and so on. That is the main reason they oppose privatization (Cheng, 2007).

According to privatization commission (2000) the need for privatization: “uncertain prices, lack of competition and poor government administration of business have stuck economic development, introduced inefficiencies, generated unproductive and unsustainable employment, slowed down investment, reduced entrance to services by the poor, resulted in inferior goods and services, and contributed to fiscal bleeding”. The above researchers shows different views about privatization some says that it can increase efficiency and productivity which leads to profitability whereas some researchers shows that it create job losses, less benefits, more workloads, tough duties which shows that negative impact on employment level.

**2.2 Theory Building**

Some writers believe that employees regularly gained from privatization only when new investments and vibrant expansion have led to new job creation at both the enterprise and sectorial levels, but also when productivity improvements have resulted in better terms and conditions of service” (Cheng, 2007).

Another argument for privatization is to promote competition and to strengthen capital markets. If all the units in certain sectors like cement are owned by the state and these are sold to different parties, there would be healthy competition” (Khan D. A.). Privatization leads to competition, innovation and investment in the country so there is a diagram showing the relationship among these variables.

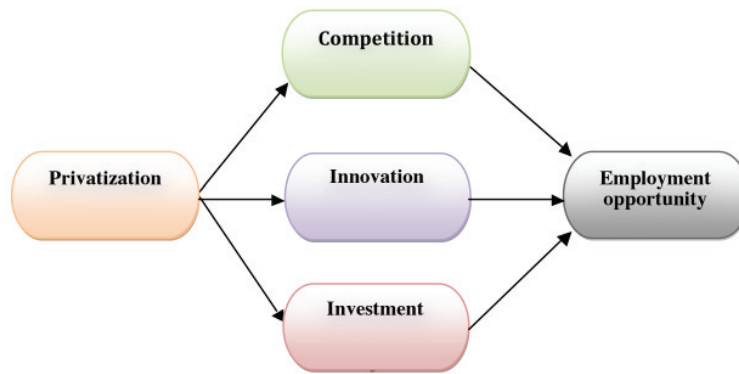


Figure 1

**2.3 Hypothesis**

- H0: There is no significant relationship between privatization and employment opportunity.
- H1: There exists a significant relationship between privatization and employment opportunity.
- Tables

Table 1: Number of privatized transactions (Rs. in millions)

SECTOR	Sale proceeds 1991 to Jun 2014	
	No.	Amount
Banking	7	41,023
Capital Market Transaction	22	133,124
Energy	14	51,756
Telecom	4	187,360
Automobile	7	1,102
Cement	17	16,177
Chemical	16	1,643
Engineering	7	182
Fertilizers	7	40,281
Ghee Mills	24	842
Rice	8	236
Roti Plants	15	91
Textile	4	370
Newspapers	5	270
Tourism	4	1,805
Others	6	159
<b>Total</b>	<b>167</b>	<b>476,421</b>

Source: Privatized commission of Pakistan

The above data is taken from the website of Privatized Commission of Pakistan which shows total privatized transactions and their amount from the year 1991 to June 2014. “Whereas level of employment declines in the short run following privatization, over longer run it may result in higher levels of employment through higher levels of investment and production. As a result of privatization, the public investment starts falling but the private sector may more than compensate and as such total investment may rise. This is because more avenues are opened up for the private sector and it builds up the confidence of the private sector especially of the foreign private investors” (A.R.kamal, 1991).

**3. Methodology**

*3.1. Research Goal*

In this survey we aim to identify the effect of privatization on employment opportunities in Pakistan. To test the propositions, a field survey using questionnaires was conducted. In line with the requirements of the research, descriptive statistics were further used. For this purpose a cross-sectional survey will be made. Research design will be descriptive type of study. The survey method was used in this descriptive research.

*3.2. Sample and Data Collection*

The survey of this study is conducted on 100 middle and senior managers of privatized organizations, companies or banks in Pakistan, For this research, we used probability sampling techniques because it is appropriate for quantitative approach method. The questionnaire survey method was used to collect data. The questionnaire was only distributed amongst Pakistani consumers, mainly in the Lahore and the companies which are privatized. Data obtained from those questionnaires were analyzed through the SPSS statistical packet program and proposed relations were tested through regression analyses.

*3.3. Results*

Table 2. Descriptive Statistics

	<i>Mean</i>	<i>Std. Deviation</i>	<i>N</i>
<i>employment</i>	4.3400	.63913	100
<i>privatization</i>	4.2500	.67232	100
<i>investment</i>	4.1800	.74373	100
<i>innovation</i>	4.2900	.65590	100
<i>competition</i>	4.2500	.65713	100

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.787 <sup>a</sup>	.619	.556	.44802	.619	9.853	14	85	.000	2.123
a. Predictors: (Constant), Q15, Q8, Q10, Q2, Q14, Q3, Q5, Q4, Q6, Q12, Q11, Q13, Q7, Q9 b. Dependent Variable: Q1										

Table 4

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	2.130	.792		2.690	.008					
privatization	.035	.099	-.033	-.354	.724	-.082	-.036	-.033	.984	1.016
Investment	.133	.087	.147	1.532	.129	.131	.155	.143	.945	1.058
Innovation	.395	.098	.386	4.019	.000	.384	.381	.376	.948	1.055
Competition	.005	.100	.005	.047	.963	.109	.005	.004	.915	1.093

a. Dependent Variable: Q1

3.4 Multiple Regression Equation

$$Y = a + bx_1 + cx_2 + dx_3 + ex_4$$

In this case y = employment opportunity & x<sub>1</sub> = privatization, x<sub>2</sub>=investment, x<sub>3</sub>=innovation and x<sub>4</sub>=competition.

So regression equation becomes:  $Y = 2.130 + 0.35X_1 + .133X_2 - .395X_3 + 0.005X_4$

4. Conclusion

Privatizations will generate net employment as a result of expanding production or services, employment in many privatized. Impact of privatization on employment opportunity we find that employment opportunity depends on privatization, investment, innovation and competition. The investment increase in the private sector new technology applied in these sectors. Privatization can bring benefits to other workers as new jobs are created with new investments and dynamic expansion but it cannot be says that privatization only increase employment opportunities in the country. The privatization program as a whole, by injecting new investment, introducing better management, improving competitiveness, and leaving more money in the hands of the public, is likely to result in increased employment opportunities.

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## OFF-016

**Nominal Gdp Targeting: A New Framework for Central Bank of Turkey**Kadir Tuna<sup>a</sup>, K.Dağhan Gökçe<sup>b</sup><sup>a</sup>*Faculty of Economics, Istanbul University, Bayezit, Istanbul, Turkey*<sup>b</sup>*Institute of Social Sciences, Istanbul University, Bayezit, Istanbul, Turkey***Abstract**

This paper examines the feasibility of Nominal GDP Targeting for Central Bank of Turkey (CBoT) while its heterodox practices are in process and under the government's strong reproof. The paper consists of mainly 3 parts; first the literature review of inflation targeting, then more focus is given to theoretically discuss nominal GDP targeting. The last part aims to give insight to CBoT policies and practices under the different monetary policy approaches. While inflation targeting is carefully assessed as is the current practice of CBOT, the flexible version of it in terms of time horizon adjustment and its further application consideration under nominal GDP targeting are highlighted. As the continuous failure of CBoT in overshooting the price level targets in the past years is underway, the global discussion of nominal GDP targeting may be the the right time for more credibility.

**1. Introduction**

Central Bank of Turkey(CBoT) strongly agrees that a low level inflation target, 5% in Turkey case, is achieved by sufficiently limiting the broad monetary aggregate, credit growth, the exchange rate fluctuations and believed to be controlling the banking system's capital adequacy and leverage. In its loss function, whilst the medium-term inflation target is outloud communicated to public, the output gap weight in function is ambiguous. While the focus on financial stability, the structural and conjunctural policies, banking supervisions are intact; other asset classes, mainly housing activity and prices, and the households' indebtedness, gold and other out-of-the-system income and possessions, are overlooked and even not mentioned in the minutes of meetings. Such action is similar to the practices of major global central banks such as Fed, BoE and ECB as can be found in minutes of meetings of the respective central banks prior to the global crisis of 2008. Initially the current practice of inflation targeting is explained with an insight of CBoT policies, then the details of nominal GDP targeting as a proposed framework are given under the light of proposed targets for CBoT. Our aim here is to provide a framework from a reverse angle for preemptive actions in the upswings of the housing activity in order to prevent the potential costs of the bubble burst while analyzing the inflation targeting monetary policies' possible counter-growth practices. Hopefully these conclusive insights will highlight the housing sector's 8-year boom and bust cycle and the volatile GDP growth and will reveal the household's low indebtedness to housing activity boom contradiction.

**2. Literature Review And Hypotheses**

Inflation targeting has some obvious general advantages, and some potentially serious problems. The general advantages include focusing monetary policy directly on achieving the goal of low and stable inflation. With a specified quantitative target, it provides an ex-post measurement of monetary policy performance, namely realized inflation relative to the inflation target. It also provides measurement of the credibility of monetary policy, in the form of measures of inflation expectations relative to the inflation target. (Mishkin and Schmidt-Hebel (2007)) Both these measurements simplify the evaluation of monetary policy and thereby the accountability of monetary policy is increased. By increasing accountability, inflation targeting may serve as a potential commitment mechanism, reduce or eliminate any inflation bias (for instance, due to the reasons examined in Barro and Gordon (1983)) and increase the likelihood of achieving and maintaining low and stable inflation, as well as anchoring and stabilizing inflation expectations. However, inflation targeting faces some potentially serious problems with regard to both its implementation and its monitoring. First, inflation targeting may be difficult to implement, for the simple reason that central banks have imperfect control over inflation. (Svensson 1997) Current inflation is essentially predetermined by previous decisions and contracts, which means that central banks can only affect future inflation. Long and variable lags, and variable strength in the effect of monetary policy on future inflation make decisions on current instrument setting inherently difficult. Inflation is also affected by other factors than monetary policy, in particular disturbances that occur within the 'control lag' between the instrument change and the resulting effect on inflation. Second, the imperfect control over inflation makes monitoring and evaluation of monetary policy by the public inherently difficult. For instance, with a control lag of 1.5-2 years, it appears that current monetary policy cannot be evaluated until realized inflation has been observed 1.5-2 years later. However, that observed inflation is the result of several other factors than monetary policy, in particular disturbances that monetary policy cannot respond to due to the control lags. (Martinez 2009) Thus, measuring monetary policy performance is not straightforward. A central bank may argue that a particular deviation of realized inflation from the inflation target is due to factors outside its control, and that it should hence not be held accountable for the deviation. In practice, much of interest rate setting is not driven by looking at inflation and growth forecasts at all horizons, but is based on rules of thumb. In particular, inflation-targeting is usually based on inflation forecasts 1-3 years out, often with a focus on a fixed horizon such as two-years. This can have the effect that asset price misalignments get an insufficient weight in policymaking so presumably and practically, meaning that central bank should also incorporate asset price misalignments. (Cecchetti, Genberg and Wadhvani 2002) Suppose, however, that a large asset-price increase is deemed to be fragile and a possible bubble, with a significant risk for a future collapse. Suppose further that a future collapse is deemed to have undesirable consequences for future inflation and resource utilization. Then the central bank faces a delicate situation. It is possible that a policy-rate path with a higher policy-rate in the near future will be deemed to dampen asset-price increases in the near future and also reduce the risk or size of a collapse in the more distant future, thus undershooting the inflation target in the near term but providing a more stable development of inflation and resource utilization in the medium and longer term. These are examples of situations when the central bank may choose to respond to asset-price developments. However, the reason for these responses is that the central bank is concerned with the repercussions for inflation and resource utilization, not with the asset prices as such. That is, asset prices are not target variables; they do not enter the loss function. Asset-price movements and asset-price bubbles may directly threaten financial stability and cause the financial-stability constraints on monetary policy to bind. (Bordo and Jeanne



2002) Thus, the central bank may want to respond to asset price developments that increase the risk of financial instability in the future. Again, in many realistic situations, the difficulty in making such judgments will be very great and there will be insufficient information for taking such preemptive action in many cases. Although a considerable amount has been written on the theory of nominal GDP targeting, fewer studies have examined the practical aspects of nominal GDP targeting; notable exceptions are Taylor (1996a), McCallum (1988, 1990), Judd and Motley (1991, 1992). Recent months have witnessed an upsurge of interest in the idea that, to quote *The Economist* (2011), "... rather than directing monetary policy to hit inflation targets (as they have done for the past 20 years) central banks should take aim at nominal GDP (or NGDP)." That is, the idea is that central banks should conduct monetary policy so as to keep the growth rate of aggregate nominal spending at a specified numerical value. This value would equal the sum of the central bank's target inflation rate and the economy's long-run average rate of output (real GDP) growth. The belief of supporters of the suggestion is that successful achievement of this objective would yield the same long-run average inflation rate as would achievement of an inflation target, and also the same long-run growth of output, but would do so with a reduced volatility of output fluctuations. The biggest global setback hit of September 2008 proved to be quite wrong, when it became clear that central banks that had been relying on inflation targeting had not paid enough attention to asset bubbles and that the consequences for the economy were severe. Central bankers had told themselves that they were giving asset markets all the attention they deserved, by specifying that housing prices and equity prices could be taken into account to the extent that they carried information regarding goods inflation. But this escape clause proved insufficient: When the global financial crisis hit, suggesting at least in retrospect that monetary policy had been too loose during the years 2003-2006, it was neither preceded nor followed by an upsurge in inflation. Meaningfully that the boom-bust cycle could take place without inflation should not have come as a surprise (White and Borio 2004). The same thing had happened when asset market bubbles ended in crashes in the United States in 1929, Japan in 1990, and Thailand and Korea in 1997. While the lack of response to asset market bubbles was probably the biggest failing of inflation targeting, another major setback was inappropriate responses to supply shocks and terms of trade shocks. The leading candidate to take the position of preferred nominal anchor is probably more of a nominal GDP targeting than a modified inflation targeting. Even though nominal GDP targeting has gained popularity rather suddenly, the idea is not new. It had been a candidate to succeed money targeting in the 1980s, because it did not share the latter's vulnerability to velocity shocks (i.e., shifts in money demand) (Frankel 1990, 2007). Under certain conditions, it dominates not only a money target (due to velocity shocks) but also a price level target (if supply shocks are large) (Frankel and Chinn 1995, Frankel 1997, Frankel et al. 2008). First proposed by James Meade (1978), it attracted the interest in the 1980s of such eminent economists as Charlie Bean (1983), Ken West (1987), Martin Feldstein and Jim Stock (1994), Bob Hall and Greg Mankiw (1994) among others. As a matter of fact now nominal GDP targeting is back. Indeed, *The Economist* has held up the successful revival of this idea as an example of the benefits to society of the blogosphere. Economists at Goldman Sachs have also come out in favour (see *Business Insider*, Weisenthal 2011). Fans of nominal GDP targeting point out that it would not, like inflation targeting, have the problem of excessive tightening in response to adverse supply shocks. Nominal GDP targeting stabilises demand. An adverse supply shock is automatically divided between inflation and real GDP, equally, which is pretty much what a central bank with discretion would do anyway. In Turkey, monetary easing and tightening, output and aggregate demand volatility were manipulated—stimulated with corridor-wise heterodox structural policies attached with reserve requirement ratios and reserve option coefficient—that have not been strong enough neither to achieve core and CPI inflation targets nor the steady sustainable growth path or restoration of output to potential. Additionally it is hard to get the real interest rate down when the nominal interest rate target is already close to structural barrier of 5%. Not only but also, it is hard to deny that this would damage the medium-run credibility of the sacrosanct 5% number. An attraction of nominal GDP targeting is that one could set a target for nominal GDP that constituted minimum 10% increase over the coming year and yet one would not be giving up the hard-won emphasis on 5% inflation as the long-run anchor. Thus nominal GDP targeting could help address Turkey's projected current potential & required growth path problems as well as a durable & credible monetary regime on behalf of CBOT for the future.

The main objection would probably be why use of the rate of growth of some nominal spending measure would be better than use of the rate of growth of a broad price index as the crucial variable on which central bank should focus. In that regard, a basic consideration is that inflation is not the only macro variable that the central bank wishes to influence in a productive manner. Output (and employment) also should be of great concern, so it is desirable (as well as politically inevitable!) that the bank takes this real variable into account in making its policy decisions. In fact, inflation targeting has come to mean, among central bankers as well as academics, a policy that focuses not only on inflation but also on measures such as the output gap and slow adjustment of prices to changes in macroeconomic conditions. To focus on nominal GDP growth is one way of taking into account both inflation and real output considerations. It also has the desirable feature that it gives the central bank an objective that is expressed entirely in nominal-monetary terms.

When academic economists suggested nominal income targeting to Federal Reserve officials in the 1980s, often the main objection put forth was that it would be difficult for the public to understand. But it seems likely that it would be easier for the public to understand nominal GDP growth than a target that includes an unspecified weighted average of an inflation rate and some unreported major adjustment to take account of output and/or unemployment conditions. Indeed total spending in the economy is a way of describing nominal GDP that would make that concept at least as easy to understand by average citizens as core inflation or even CPI inflation. But suppose that the bank were to be explicit and clear about weights to be attached to target levels of inflation and output-gap variables separately. How would nominal income targeting compare with that type of inflation targeting substantively, i.e., in terms of results? Here it may be argued to be plausible that movements in nominal spending growth would be more closely and reliably related to central bank policy actions—primarily open market sales and purchases—than would movements in inflation and output separately. If so, then the central bank that targets nominal GDP would not have to rely upon its models of the way in which nominal and real variables are related, that is, its model of the Phillips curve relationship. That is a significant advantage, because the Phillips curve relationship is the component of quantitative (econometric) macroeconomic models for which professional understanding and agreement is, by far, the weakest. Thus, if the central bank can manage nominal spending growth in a manner that does not involve conceptually the Phillips curve, it can conduct policy without use of that elusive relationship. By contrast, if it focuses on inflation and real GDP separately, or on inflation alone, it cannot possibly avoid its use. In this model, bank determines the amount of spending in nominal terms, with the private sector's behavior determining how much of any change in spending will be in terms of (real) output changes and how much will be in (nominal) price level changes. Since the long-run average growth rate of private demand in real terms is due to growth of labor, capital, and technological progress—none of which will be strongly affected by the average inflation rate (according to almost universal agreement among monetary/macro economists)—the CBOT's choice then yields the desired (target) inflation rate on average. One other issue that arises in discussions of nominal GDP targeting is whether the targets should be expressed in terms of "level" or "growthrate" measures. For an example of the distinction, suppose that the chosen rate of growth of nominal GDP is 10% per year. Suppose that in some year, however, the central bank misses that target by a full percentage point on the high side, yielding 11% growth consisting of 8% inflation and 3% real growth. Should the central bank strive

for the usual 10% growth in nominal GDP again in the following year? Or should it decrease its growth target aiming thereby to be back at the original path for the nominal GDP level at the end of the next year? In other words, should the nominal GDP targets be set in terms of growth rates or growing levels? In the latter case, the disadvantage will be that policy that decreases nominal growth below its usual target value may be excessively restrictive, whereas the former case leaves open the possibility of cumulative misses in the same direction for a number of periods. According to my view, keeping with the target growth rates (in this case presumably 10%), if they are on average equal to the correct value over time, will be unlikely to permit much departure from the planned path. This is not at all a universal point of view, however, among nominal GDP supporters.

### 3. Methodology

#### 3.1. Case of Central Bank of Turkey

In CBoT case, the forecasts of inflation and the real economy are conditional on the central bank's view of the transmission mechanism, an estimate of the current state of the economy and a forecast of important exogenous variables, such as oil and global food prices. (Fig. 1 and Fig. 2 respectively) The CBoT uses all relevant information that has an impact on the forecast of inflation and the real economy. In this framework, the CBoT takes financial conditions such as credit growth, asset prices, imbalances, potential bubbles and so on into account only to the extent that they have an impact on the forecast of inflation, resource utilization and output gap. Inflation and resource utilization are target variables here, that is, variables that are arguments of the central bank's loss function. However, financial conditions are not target variables. Instead, they are only indicators, as they provide information about the state of the economy, the transmission mechanism and exogenous shocks to the central bank. Financial conditions then affect policy rates only to the extent that they have an impact on the forecast of inflation and resource utilization.

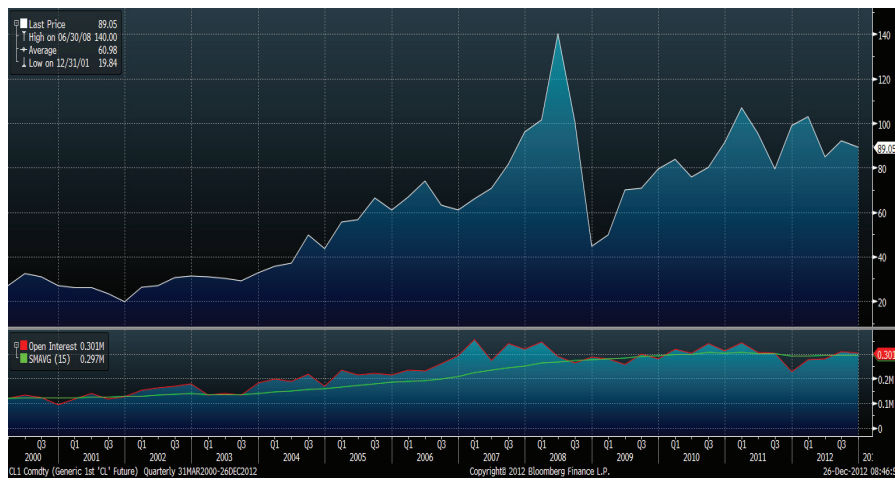


Fig. 1. WTI Oil Prices

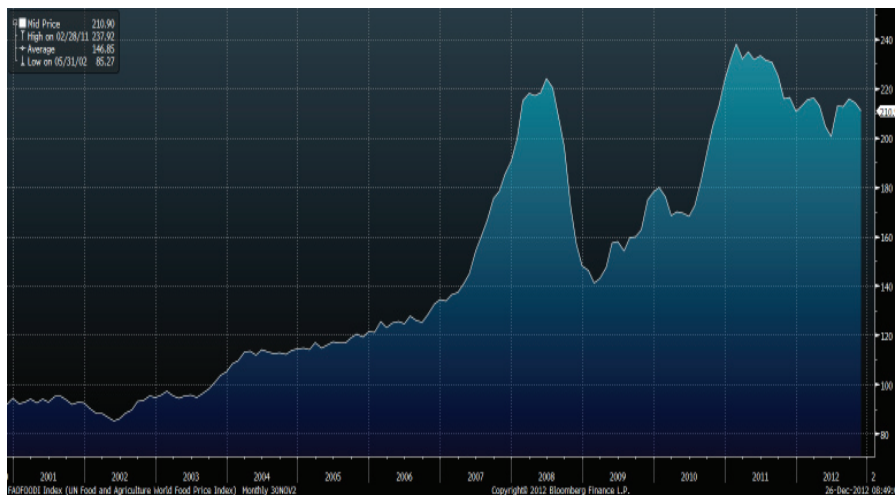


Fig. 2. Global Food Prices(FAO Index)

Turkish economy adjusts better if monetary policy responds to an increase in the world prices of its exported commodities by tightening enough to appreciate the currency. But CPI targeting instead tells the CBoT to appreciate in response to an increase in the world price of the imported commodities – exactly the opposite of accommodating the adverse shift in the terms of trade- as happened in first half of 2012. As another setback example was the reason that oil prices were reaching an all-time high in 2008. Oil prices get a substantial weight in the CPI, so stabilising the CPI when dollar oil prices go up requires appreciating TL versus the dollar or widening the corridor funding rate of CBoT and positioning to the upper threshold which lead to output and growth fluctuations. Moreover, inflation targeting sometimes gave the Turkish public the misleading impression that it would stabilise the cost of living even in the face of supply shocks or terms of trade shocks, over which CBoT in fact have no control.

3.2. Monetary Policy Framework Analysis of Central Bank of Turkey

The CBoT conducts monetary policy aimed at keeping inflation, as measured by the total consumer price index (CPI), at 5 per cent, with a control range of 3 to 7 per cent around this target. The inflation target is symmetric, which means that the Bank is equally concerned about inflation rising above or falling below the 5 per cent target. The Bank uses core inflation as an operational guide for its monetary policy because it is an effective indicator of the underlying trend in CPI inflation in Turkey. Core inflation, along with other measures of inflationary pressures, is monitored to help achieve the target for total CPI inflation; it is not a replacement for the latter.

Table 1 Central Bank of Turkey Inflation Target Performance

Year	Target	Realization	Deviation %
2002	35.00	29.70	-15.14
2003	20.00	18.40	-8.00
2004	12.00	9.30	-22.50
2005	8.00	7.70	-3.75
2006	5.00	9.70	94.00
2007	4.00	8.40	110.00
2008	4.00	10.10	152.50
2009	7.50	6.50	-13.33
2010	6.50	6.40	-1.54
2011	5.50	10.40	89.09

As in the global major economies, a flexible exchange rate is a core element of CBoT’s monetary policy framework. A floating Turkish Lira plays a key role in the transmission of monetary policy and allows the Bank to pursue an independent monetary policy. It also helps to absorb shocks to the economy. Movements in the exchange rate serve as automatic buffers, helping to insulate the economy from external and internal shocks. As the process is reviewed in Turkey, in a complex and continuously evolving world that no one can predict with certainty, policy-makers need a robust framework; one that remains appropriate no matter the circumstances. Inflation targeting, as practised in New Zealand and Canada is disciplined but flexible. It allows central banks to deliver what is expected while dealing with the unexpected. There are two crucial features of that regime.

The first is that the central bank must be flexible about the horizon over which it returns inflation to its long-run target. The second is clear and open communication. The CBoT should be flexible regarding the time horizon to return inflation to target the way in which a central bank achieves its inflation target can be adjusted, depending on the circumstances. Under flexible inflation targeting, the central bank seeks to return inflation to its medium-term target while mitigating volatility in other dimensions of the economy that matter for welfare, such as employment and financial stability. For most shocks, these goals are complementary. However, for shocks that pose a trade-off between these different objectives, or that tilt the balance of risks in one direction, the central bank can vary the horizon over which inflation is returned to target. Typically, the CBoT seeks to return inflation to target over a horizon of eight quarters or two years. However, over the past years, there has been considerable variation in the horizon, in response to varying circumstances and economic shocks. This flexibility is required because, when taking monetary policy actions to stabilize inflation at target, the Bank must also manage the volatility that these actions may induce in the economy. These trade-offs will differ depending on the nature and persistence of the shocks buffeting the economy. There are, broadly speaking, three sets of circumstances under which it may be desirable to return inflation to target, from above or below, over a horizon that is somewhat longer than usual. First, the unfolding consequences of a shock could be sufficiently large and persistent that a longer horizon might be warranted in order to provide greater stability to the economy and financial markets.

Stability considerations could lead the Bank to accommodate over a somewhat longer period, for example, the inflationary consequences of an unusually large and persistent increase in oil prices, or the disinflationary consequences of a severe global slowdown. Second, through a longer targeting horizon, monetary policy can also promote adjustments to financial excesses or credit crunches. For instance, there could be situations where, even though inflation is above target, ongoing monetary policy stimulus and a somewhat longer horizon to return inflation to target would be desirable in order to facilitate the adjustment to broad-based deleveraging forces that are unfolding. On the flip side, a tighter monetary policy that allows inflation to run below target for a longer period than usual could help to counteract pre-emptively excessive leverage and a broader build-up of financial imbalances. In first half of 2012, the CBoT has used such guidance to reinforce macroprudential measures implemented by the Government of Turkey.

By indicating that some tightening of monetary policy may be necessary, a degree of prudence in household borrowing has been encouraged. For example, the rate of household credit growth has decelerated. Third, the optimal inflation-targeting horizon will vary with the evolution of the risks to the outlook. Shocks to the economy, both observed and prospective, are inevitably subject to a degree of uncertainty. In some situations, risks to the inflation outlook could be skewed to the downside. In these cases, a balance must be struck between setting monetary policy to be consistent with the most likely outlook and the need to minimize the adverse consequences in the event that downside risks materialize. This would warrant a more stimulative setting for monetary policy than would otherwise be desirable in the absence of the downside risks. However, if the downside risks fade away rather than materialize, the resulting stronger inflationary pressures would merit returning inflation to target over a longer horizon.

The opposite would be true under circumstances where risks to inflation are skewed to the upside. In short, changing economic circumstances could demand some flexibility in the horizon over which the Bank seeks to restore inflation to target. Surely there are limits to this flexibility. The Bank’s scope to exercise it is founded on the credibility built up through its success in achieving the inflation target in the past, and its clarity in communications

when it uses it. If Turkish government chooses to go beyond flexible inflation targeting, there are two possible avenues. The first is to target a higher rate of inflation at all times. The second is to target not the growth rate of prices but the level of prices or nominal incomes. Some have suggested that major central banks should target an inflation rate higher than 2 per cent. Understandably, moving opportunistically to a higher inflation target would risk de-anchoring inflation expectations and destroying the hard-won gains that have come from the entrenchment of price stability. Moreover, if inflation is both higher and more uncertain, a higher inflation risk premium might result, prompting an increase in real rates that would exacerbate unfavourable debt dynamics across public and private borrowers. These problems have led some academics, policymakers and private sector analysts to propose other mechanisms that may allow a different path of inflation in the short term, but maintain a long-run commitment to a fixed low inflation rate. There are several mechanisms—including targeting the level, rather than growth rate, of prices or nominal GDP—that could allow greater flexibility and deliver better outcomes for inflation and growth without a permanent change to the inflation target.

These policy frameworks have the potential to achieve better outcomes in part because they add ‘history dependence’ to monetary policy. Under Price Level Targeting (PLT), monetary policy would seek to make up for past deviations in order to restore the price level to a predetermined path. For example, following a period of below-target inflation, policy would seek a period of above-target inflation in order to ensure that average inflation corresponds to targeted inflation (the desired rate of change in the price level) over time. The more the price level were to undershoot the target, the more the central bank would need to stimulate the economy to make up the undershoot, and the more inflation expectations would thus be expected to rise and real interest rates to fall, supporting spending and prices. While the rise in near-term inflation expectations would be self-limiting by design, unwinding as the price level approached the desired path.

PLT may merit consideration as a “temporary” unconventional policy tool faced with extraordinary circumstances, notably those with a heavy burden of debt. The next step from Price Level Targeting is a target for the level of nominal GDP (NGDP). Under NGDP level targeting, the central bank is compelled to make up for deviations of the level of nominal GDP from some pre-determined trend. In theory, committing to restore the level of nominal GDP to its pre-crisis trend could raise expected inflation over the short and medium term but keep longer-term expectations well anchored. That would reduce real interest rates for a time, providing added stimulus to the economy. Of course, the effectiveness of this strategy depends crucially on how expectations adjust. To reap the potential gains from NGDP-level targeting, expectations would have to adjust the way theory says they should. That requires the change in policy regime to be both credible and well understood. The public would need to be fully conversant with the implications of the regime and trust policy-makers to live up to their commitment. These conditions may not be met. In the worst case, if nominal GDP targeting is not fully understood or credible, it can, in fact, be destabilizing and damaging to the central bank’s credibility.

Like flexible inflation targeting, NGDP-level targeting can be effective in dealing with so-called negative ‘supply shocks’, such as a sharp rise in oil prices. It may also deal well with positive supply shocks (a productivity-enhancing new technology, for example) that boost real GDP growth while lowering inflation. A central bank that targets the level of NGDP would to some extent look through this ‘good deflation,’ thus avoiding a potential problem of helping to sow the seeds of an asset bubble. The main drawback of an NGDP level target in this regard is that it imposes the arbitrary constraint that prices and real activity must move in equal amounts but opposite directions. As potential real growth changes over time, either the nominal target will have to change or else it will force an arbitrary change in inflation in the opposite direction.

#### 4. Conclusion

Flexible inflation targeting is the standard approach to bridge the different time horizons for financial and price stability. However, there are limits. The time frame for inflation targeting can be stretched, but the credibility essential for its success may be undermined if such flexibility is taken too far or deployed too frequently. The paramount goal of monetary policy in Turkey has been, and remains, price stability. The primary tools to deal with financial stability are micro- and macroprudential regulation and supervision. Macroprudential tools are not a substitute for monetary policy in controlling inflation, and monetary policy cannot substitute for proper micro- and macroprudential supervision and regulation in maintaining financial stability but volatile global economic conditions and barely foreseen outside shocks do require more flexibility to adjust the domestic economy dynamically, besides using unconventional measures, to preserve credibility and accountability.

As the newest triple target set by the CBoT reveals its current strict commitment to 5% inflation target while maintaining 5% CAD/GDP and 5% GDP Real Growth targets, it insists on lowering structural inflation threshold expectations under government’s heavy pressure for lower nominal rates and jeopardizes the macro outlook on already volatile GDP and cyclical unemployment. The newly set population growth rate by the prime minister requires more attention under these circumstances while on the one hand unemployment and GDP growth fluctuate and on the other hand domestic demand is under continuous control for the sake of financial stability. The two caveats to this problematic should be to reconsider asset misallocations, income disparities whilst the potential growth is to be steady-standardized in order not to exacerbate the future outlook of CBoT’s triple mandate duties.

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## OFP-017

## Study of Interactions Mixtures (Biodegradable Polymer / Active Ingredient) Obtained by Different Methods of Preparation

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### Abstract

The Niflumic acid is a non-steroidal anti-inflammatory drug (NSAID) and a poorly water-soluble derivative of nicotinic acid with relatively low bioavailability. So, the present paper is devoted to the preparation of new formulations based on the combination of niflumic acid and the beta-cyclodextrin in order to optimize its pharmaceutical and physico-chemical properties. The effect of beta-cyclodextrin on the aqueous solubility and dissolution rate of niflumic acid was studied and elucidated. The binary systems of the compounds (1:1) molar ratios were prepared by different methods and the inclusion complexes were characterized by FTIR, XRD, and UV. The interaction between niflumic acid and  $\beta$ -cyclodextrin in solution was studied by phase solubility analysis. The results of this study revealed that the complexation of niflumic acid with  $\beta$ -cyclodextrin can improve the therapeutic efficacy of the drug through the greater efficiency of the drug dissolution.

### 1. Introduction

The oral route of drug administration requires that a drug dissolves in the gastro-intestinal fluid and then transfers to the bloodstream. Subsequently, the drug solubility in aqueous medium is the major factor affecting the dissolution and the oral drug absorption. The drug solubility can be modified by using various techniques such as the modification of the crystalline forms of drugs, the use of buffers or Co-solvents, the addition of surfactants or by the complexation methods. These are the most common pharmaceutical techniques used to enhance the drug solubilization (Lee et al., 2007; Atwood et al., 1996).

In our research, we are interested by the complexation techniques. In fact, many studies have shown that the drug-complexation with cyclodextrins improved the drug aqueous solubility and consequently its oral absorption (Zhang et al., 2001; Saravana et al., 2013; Neelam et al., 2012).

Really, cyclodextrins are water-soluble cyclic oligosaccharides; the interior of cyclodextrins is non polar and has hydrophobic cavity, the exterior is relatively hydrophilic. There are three types of cyclodextrin most commonly encountered:  $\alpha$ ,  $\beta$ , and  $\gamma$ -cyclodextrin, which are constituted respectively of 6, 7 and 8 of D-glycosidic units linked in  $\alpha$  (1, 4) (Zhang et al., 2001; Asgharian et al., 1988).

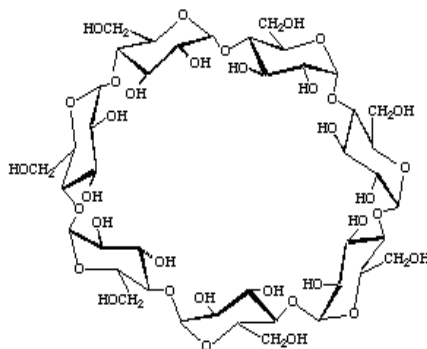


Fig.1. Chemical structure of  $\beta$ -cyclodextrin

Cyclodextrins have the ability to include molecules in their cavities; these are used in the pharmaceutical industry in order to improve the bioavailability of the active ingredients and reduce their side effects (Ueda, 2006), and also in cosmetics and food industries as masking odors and for the stabilization of volatile or oxidizable products (Zhang et al., 2001; Uekama et al., 1998)

The Niflumic acid is a non-steroidal anti-inflammatory drug (NSAID) derived from nicotinic acid. It has both analgesic and antipyretic activities; these properties are related to inhibition of prostaglandin synthesis (Aussel et al., 1987). It has an unpleasant taste; it is used in the local treatment of tendinitis and sprains. This drug fights against inflammation and pain and lowers fever (Avouac, 1995). It is used in the symptomatic treatment of inflammatory rheumatism and the crises of osteoarthritis (Houdeshel et al., 1977). It is also used in adjunctive treatment of painful inflammation of the ear, nose, throat, oral disease and dental (Savaser et al., 2005).

The niflumic acid is amphoteric compound, it has the dual character of weak acid and weak base ( $pK_{a1} = 2.1$  and  $pK_{a2} = 5$ ), the degree of dissociation and the same character of its solubility vary depending on its pH environment (Dalton).

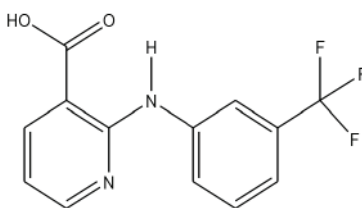


Fig. 2. Chemical structure of Niflumic acid

Since the  $pK_a$  of this active agent is weak, solubility may also be low at physiological pH. In fact, the aqueous solubility of niflumic acid is equal to 0.019g/L at pH 7 and 25 °C. Therefore it is important to improve the rate of solubility and dissolution of niflumic acid to improve its overall oral bioavailability (El-Kamel et al., 2008; Duchêne et al., 1985).

In this paper, the complex of niflumic acid with beta-cyclodextrin was prepared in the molar proportion (1/1) according to several ways: physical mixture, kneading process and evaporation method. The prepared inclusion complexes were characterized by UV-Vis, FTIR, and X-ray analysis. Solubility studies in water ( $\beta$ -cyclodextrin/ niflumic acid) and velocity profiles dissolution complex were performed.

## 2. Materials and methods:

### Materials:

$\beta$ -cyclodextrin ( $\beta$ -CD) and niflumic acid (NA) were purchased from Sigma-Aldrich, both were used as received without purification, all other reagents and chemicals were of analytical quality.

### Preparation of binary systems of niflumic acid / $\beta$ -cyclodextrin:

Binary systems of niflumic acid and  $\beta$ -CD were prepared in the molar ratio 1: 1 (1mM:1mM) using the following methods (Brahmanker et al., 1999; Scott et al., 2002):

#### Physical mixture:

The physical mixture was prepared by incorporating adequately quantities of niflumic acid and  $\beta$ -CD in mortar. The powders were carefully screened and weighed and intimately mixed to obtain homogeneous complex.

#### Kneading method:

1 mM of  $\beta$ -CD and distilled water were mixed together to a smooth paste in a mortar. Then, Niflumic acid was added gradually under grinding. At the same time, a small amount of ammonium hydroxide (0.5 ml of  $NH_4OH$  at 35%) was added to facilitate dissolution of niflumic acid. The mixing and grinding operations were sustained for one hour. During this process a suitable amount of water was added to the mixture for a suitable consistency. The paste was dried at 40 °C in an oven during 24 hours. Finally, the dried complex was pulverized into a fine powder.

#### Evaporation method:

After the dissolution of  $\beta$ -CD in 15mL of water, the amount of niflumic acid was added. The suspension has been stirred for 24 hours. The resulting clear solution was evaporated under vacuum at a temperature of 45 °C in a rotary evaporator programmed at 100 rpm. The solid residue was subsequently dried completely at 40 °C for 48 hours.

#### Characterization of solid complex:

The complexes were characterized using the following methods: UV-Vis spectrometry, Fourier Transform Infrared spectrometry (FTIR), Powder X-RAY diffractometry:

#### Study of kinetics of dissolution of the binary systems of (Niflumic acid/ $\beta$ -CD):

Dissolution rate studies were performed according to the European Pharmacopia third edition (1997) using rotating basket method (model Heidolph RZR 2041). The dissolution behaviors of the NA/  $\beta$ -CD complexes were compared with those of pure niflumic acid and physical mixture. The pure drug and each of the binary systems were encapsulated into hard gelatin capsules and placed into rotating basket in the dissolution medium. The dissolution medium was composed from 900mL of simulated gastric fluid (SGF) of pH=1.2 without enzymes. The system was stirred at 100 rpm and the temperature was maintained at  $37^\circ C \pm 1^\circ C$ . At various time intervals, 3 mL of the dissolution medium was withdrawn, using a syringe, and replaced with the same volume of fresh dissolution medium. The sample was filtered through 0.45 $\mu$  nylon disc filter and analyzed by UV spectrophotometer at 254 nm in simulated gastric medium where  $\epsilon=462.828 \text{ mol.L.cm}^{-1}$ . The drug dissolution kinetics was performed in triplicate and the data variations were analyzed statistically.

### 3. Results and Discussion:

#### *Spectrometry UV:*

The study of ultraviolet spectrum of  $\beta$ -cyclodextrin (figure 4) and the niflumic acid with the spectra of the various mixtures (figure 5), make it possible to note only one maximum with (286nm).

The UV-VIS spectrum of niflumic acid presents 1 peak solved rather well at 286 nm, as well as a badly solved peak with 334 nm. That confirms the fact that the molecule has aromatic nuclei of which one could be a pyridine from where the peak towards the 340 nm.

We can also note that for the physical mixture there are two maxima (286 nm) (340nm), two maxima (286 and 338 nm) for the kneading method and two maxima (286 and 346 nm) for the method of evaporation.

According to the literature, spectrometry UV is not frequently employed like a powerful method to authenticate the formation of the complexes of inclusion. In this case the change in the wavelengths is too weak but generally is in the bathochrome direction.

According to the spectra one observes that the maximum moves of several nm what shows that there is a complex of inclusion because the chemical behavior of the molecules included is modified during inclusion. For the UV-VISIBLE spectrum of  $\beta$ -cyclodextrin one observes no plug of absorption.

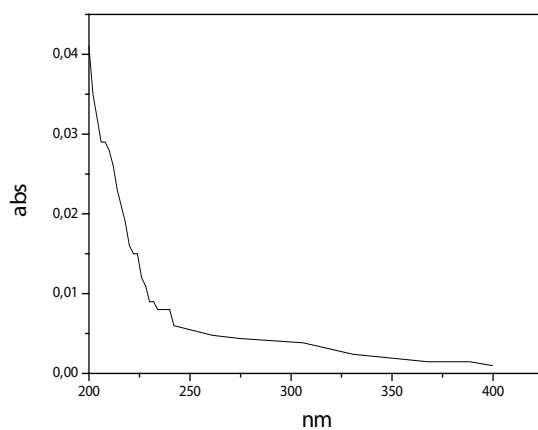


Fig. 4. UV-Visible spectrum of  $\beta$ -cyclodextrin in water

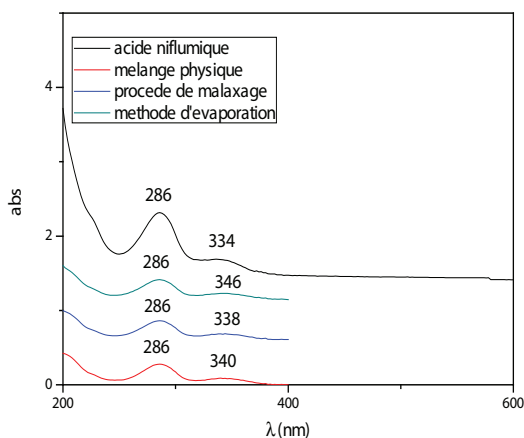


Fig. 5. UV-VIS spectrum of niflumic acid and the different mixtures prepared by various techniques

#### *Fourrier Transform Infra-Red spectrometry:*

The FTIR spectrums of the binary systems were compared to those of the pure compounds (niflumic acid and  $\beta$ -cyclodextrin). Changes in the characteristic bands of the pure substances indicate the existence of a complex of a new compound with different spectroscopic bands. (Figure 6 and 7)



FTIR spectrum of the niflumic acid presents an absorption band between 3500-2500  $\text{cm}^{-1}$  of average intensity which corresponds to the vibration of valence of connection OH of the carboxylic acid, an average band in the area between 3500-3000  $\text{cm}^{-1}$  is allotted to the vibration of valence of connection NH of the chromophoric amine. A shoulder beyond 3000  $\text{cm}^{-1}$  which suggests the presence of a connection C-H of an aromatic cycle. The analysis by infra-red spectrometry with TF also allowed, of share the absence of superposition of the bands characteristic of the host and the guest, to determine the absorption bands specific to the niflumic acid which lay between (1700-1250  $\text{cm}^{-1}$ ).

Two intense fine bands to approximately 1670-1570  $\text{cm}^{-1}$  are allotted to the carboxylic function (vibration of elongation of C=O), and to the secondary N-H amine function. In addition, the two fine and intense bands at 1530 and 1430  $\text{cm}^{-1}$  are characteristic of the vibrations of symmetrical and asymmetrical valences vs  $\text{COO}^-$  and vas  $\text{COO}^-$ .

One observes also a strong band in the area of 1400-1000  $\text{cm}^{-1}$  which corresponds to C-F bond, in the region 1000-650  $\text{cm}^{-1}$  bands can be attributed to deformation of aromatic connections C-H 1 to 5 H adjacent.

We showed that the spectrum of the free niflumic acid (zwitterion) contained characteristic bands of aromatic C=C, C=O, N-H, and the carboxylate one (vs $\text{COO}^-$  and vas  $\text{COO}^-$ ).

The complexation with the  $\beta$ -CD induced a displacement of the absorption bands of those of carboxylate of the niflumic acid towards higher frequencies.

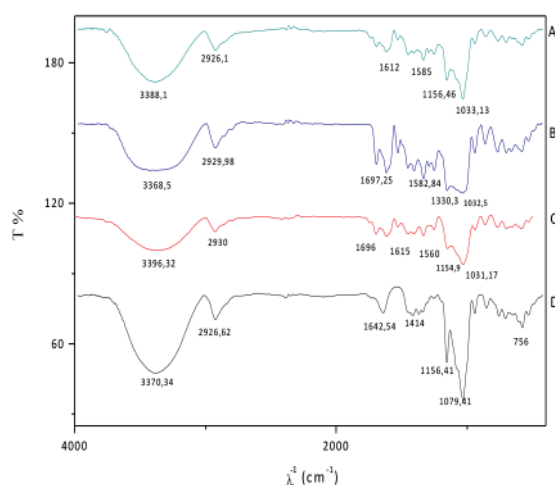


Fig. 6. Infra-red spectrum of  $\beta$ -cyclodextrin (D), and various mixtures. (A) Method of evaporation, (B) process of kneading, (C) physical mixture

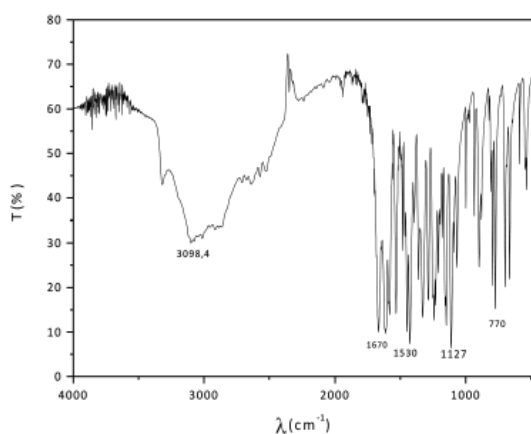


Fig. 7. Red Infra spectrum of the niflumic acid

*X-Ray diffractometry studies:*

The diagrams of x-rays diffraction for the niflumic acid,  $\beta$ -cyclodextrin as well as the corresponding prepared mixtures are presented in figure 8. Powder X-ray diffraction is a useful method for the detection of cyclodextrin complexation in powder or microcrystalline states. A diffraction pattern that is clearly distinct and not a superposition of each of the components of the binary system are indicative of formation of a true inclusion complex.

By superimposing the peaks of diffraction of the niflumic acid and  $\beta$ -cyclodextrin, we chose as characteristic peaks those which are located at  $2\Theta^\circ$  between  $6^\circ$  and  $32^\circ$ . The presence of several peaks different in the diagram from diffraction of the niflumic acid (8, 22, 24, and 27 of  $2\Theta^\circ$ ) indicates that the drug is in crystalline form. The diagrams of diffraction of the physical mixture present values of  $2\Theta^\circ$  from 10 and 12. For the mixture prepared by kneading the values are 11, 12, and 20. This shows and indicates the presence of one at the crystalline state. On the other hand, the evaporated system presents a considerable reduction in the peaks of diffraction (13, 20 of  $2\Theta^\circ$ ), suggesting that it is less crystalline than the physical and mixed mixture. The reduction in crystallinity allotted to the mixture treated by evaporation is obvious. For pure  $\beta$ -cyclodextrin, and compared to the niflumic acid, it does not show this characteristic.

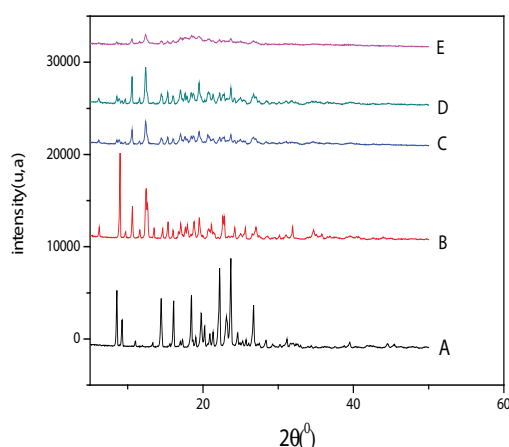


Fig. 8. X-ray diffractograms of niflumic acid (A),  $\beta$ -cyclodextrin (B), physical mixture (C), Kneading method (D), evaporation method (E)

*Solubility and dissolution rate studies:*

The results of the dissolution profiles of niflumic acid and its binary systems with  $\beta$ -cyclodextrin in simulated gastric fluid (SGF), pH 1.2, and simulated intestinal fluid (SIF), pH 6.8 are shown in figure 10 and 11.

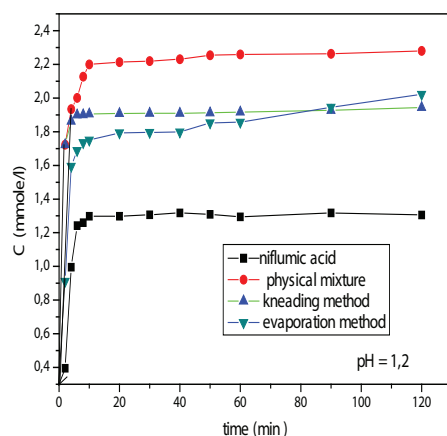


Fig. 9. Dissolution rate profiles of niflumic acid alone and from its equimolar binary systems in simulated gastric fluid pH 1.2

The aqueous solubility was expectedly comparatively higher in SGF since the drug is weakly acidic. Hence, its ionization increases in acidic medium resulting in improved dissolution of the drug. After analysis of the curves, we initially notice a certain proportionality in the variation of the concentration in the course of time, one can conclude that, the release of the active ingredient in acid medium is faster during the first 10 minutes, the dissolved quantity is very high, the complexes of inclusion release up to 80 % of the active ingredient initially present in the capsule and 85% after 30 minutes while the acid niflumic pure releases 50% after 10 minutes and more than 53% after 60 to 120 minutes. We note here that the dissolution rate in physical mixture and the kneading process are higher than the evaporation method and pure niflumic acid. This effect limits the use of these systems in prolonged

release because it would have been desirable to have a slower release in acidic medium more especially as the selected anti-inflammatory drug chosen presents an acid character and its passage is fast in the stomach.

The complex prepared by the technique of kneading offers a speed of dissolution from approximately 70% in 60 minutes which may be of a particular interest for the preparations at industrial scale. The dissolution kinetics curves for all mixtures have a similar look and the physical mixture is the most suitable.

The effect of complexation with cyclodextrin on the solubility of drugs can be explained in terms of the reduction in the crystallinity of the drug caused by preparation process and the inclusion of the drug into the hydrophobic cavity of cyclodextrine.

#### 4. Conclusion

The study demonstrated the possibility of significantly improving the aqueous solubility and dissolution performance of niflumic acid by inclusion complex formation with  $\beta$ -cyclodextrin. Phase-solubility profile indicated that: the solubility of the niflumic acid and apparent stability constant was significantly increased in the presence of  $\beta$ -cyclodextrin dimer and the niflumic acid forms a complex with the cyclodextrine at a 1:1 molar ratio. Results obtained by different characterization techniques indicate that there is a combination between niflumic acid and  $\beta$ -cyclodextrin. We used  $\beta$ -cyclodextrin to increase the niflumic acid solubility but also to mask the side effects of anti-inflammatory drug.

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## OFP-018

## Chemical Compositions of Essential Oil and Variations in Antioxidant Constituents and Properties in Different Organs of *Stachys Byzantina* Grown in Turkey

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### Abstract

Mountain tea (*Stachys byzantina*) is a plant of great medicinal importance in Turkey. To provide experimental evidence for the antioxidant activity and constituents of Mountain tea, different organs, including stems (SBS), flowers (SBF), leaves (SBL), root (SBR) and aerial parts (SBAP) were evaluated. Antioxidant activities of the methanolic extracts of different organs and essential oils (EOs) were evaluated using the thiocyanate method. We also demonstrated that the total phenol contents (TPCs) and the total flavonoid contents (TFCs) and considerable differences were found in phenols and flavonoids in methanolic extracts of different organs of *S. byzantina*. TPCs varied from 17.9±0.87 to 315.8±2.34 mg GAE/g d.m. TFCs were between 6.76±1.97 and 198.13±0.56 mg QE/g d.m. Isoscutellarein 7-*O*-[β-D allopyranosyl-(1→2)-6''-*O*-acetyl-β-*O*-glucopyranoside] (**C2**) and 4'-*O*-Methyl Isoscutellarein 7-*O*-[β-D-allopyranosyl (1→2)-6''-*O*-acetyl-β-*O*-glucopyranoside] (**C3**) were the major flavone glycosides in the SBAP (1165.77±3.02 and 972.43±1.65 mg/kg d.m.), SBF (713.61±0.12 and 457.87±4.03 mg/kg d.m.) and SBL (3018.73±2.91 and 1763.80±4.65 mg/kg d.m.) organs quantified respectively, using the high-performance liquid chromatography analysis. Apigenin 7-*O*-β-D-(6''-*trans-p*-coumaroyl) glucoside (**C1**) was also obtained. Gas chromatography-mass spectrometry (GC-MS) analysis of EOs revealed the presence of main compounds, oxygenated monoterpenes, *cis-p*-mentha-2,8-dienol (23.68%), *trans*-chrysanthenyl acetate (12.41%) and thymol (10.12%). The results of the present investigation demonstrated significant variations in the antioxidant activities and constituents in methanolic extracts at different organs of *S. byzantina* grown in Turkey and may be used for developing functional foods, in this way provides significant health benefits.

### 1. Introduction

*Stachys* species are one of the largest genus of the Lamiaceae family containing more than 270 species. Many different species of this genus are used for centuries treatment such as genital tumors, spleen stiffness, infected wounds, ulcers and inflammatory diseases (Conforti et al., 2009; Haetwell, 1982; Skaltsa et al., 1999). Furthermore, comprehensive scientific research conducted on different taxa of the some *Stachys* genus revealed that the pharmacological properties such as antitoxic, cytotoxic, antioxidant, antimicrobial and antipyretic activities (Grujic-Jovanovic et al., 2004; Haznagay-Radnai et al., 2008; Khanavi et al., 2005; Salehi et al., 2007; Vundac et al., 2007). The previous phytochemical studies on *Stachys* species have also been reported to contain natural compounds such as phenylethanoid glycosides, phenolic acids, tannins, achillein, betaine, betonicin, alkaloids trigonelline, flavonoids and stachydrine (Khanavi et al., 2009; Duke and Beckstrom-Sternberg, 2001; Matkowski and Piotrowska, 2006; Hajdari et al., 2010). Flavonoids and their glycosides are form a class of biologically active phenolic compounds which is the most common low molecular weight in the plant kingdom (Treutter, 2005; Peng et al., 2003). These compounds provide powerful antioxidant properties due to aromatic heterocyclic rings containing hydroxyl groups that supply hydrophilic property specific and stability in the result electron delocalization. These features show the effect of scavenging dangerous free radicals formed in the body.

The aim of the present study was to determine the antioxidant activity of the essential oils in part of aerial parts and the methanolic extract of aerial parts, stems, flowers, leaves, roots of *S. byzantina* and their main components. In addition, the total phenolic and flavonoid contents were determined quantitatively with different organs. The appropriate use can be provided that organs of *S. byzantina* showing the high antioxidant activity and may be advisable of use of the parts containing the dominant bioactive substances in food, cosmetic and pharmaceutical industries.

### 2. Materials and Methods

#### 2.1. Plant material

*S. byzantina* was collected from campus area of Tokat, Turkey during June–July 2006 and was identified by Ass. Prof. Dr. H. Askın Akpulat from Cumhuriyet University, faculty of Science and Literature, Department of Biology. A voucher specimen has been deposited (CUFH 4316) at the department of Botany, Faculty of Science and Art, Cumhuriyet University.

#### 2.2. Isolation of chemical constituents and essential oil

For isolation of chemical constituents (20 g) of each organs (leaves, flowers, roots and stems) and aerial parts of *S. byzantina* were separately macerated using methanol (500 ml) under laboratory conditions. The extracts were concentrated to dryness and stored at 20 °C. The extraction yields of leaves (SBL), flowers (SBF), roots (SBR), stems (SBS) and aerial parts (SBAP) extracts (w/w, in terms of initial dried material) were 17.85, 9.76, 8.09, 10.42 and 12.52%, respectively.

Essential oil from aerial part of *S. byzantina* was obtained by hydrodistillation for 4 h, using 100 g of plant material in a Clevenger-type apparatus. The obtained essential oil was dried over anhydrous sodium sulphate and after filtration, stored in an amber vial at low temperature (4 °C) prior to analysis.

#### 2.3. Standards and reagents

Gallic acid, sodium carbonate (Na<sub>2</sub>CO<sub>3</sub>), quercetin were supplied by from Sigma Chemical Co. (St. Louis, USA). Folin–Ciocalteu's phenol reagent, ferrous chloride (FeCl<sub>2</sub>), sodium hydroxide (NaOH), aluminium chloride (AlCl<sub>3</sub>), sodium nitrite (NaNO<sub>2</sub>) and methanol were all supplied by Merck (Germany). All chemicals were of analytical grade. Isoscutellarein 7-*O*-[β-D allopyranosyl-(1→2)-6''-*O*-acetyl-β-*O*-glucopyranoside] 4'-*O*-Methyl Isoscutellarein 7-*O*-[β-D-allopyranosyl (1→2)-6''-*O*-acetyl-β-*O*-glucopyranoside] and Apigenin 7-*O*-β-D-(6''-*trans-p*-coumaroyl) glucoside.

#### 2.4. Total phenolic content (TPCs)

Total phenolic content of the samples were determined using the Folin-Ciocalteu reagent according to the method by Moulehi et al. (2012) with some alterations. Volumes of 100  $\mu\text{L}$  of dissolved in suitable solvents of samples taken into test tubes and were added to 4.5 mL of distilled water and 100  $\mu\text{L}$  Folin–Ciocalteu reagent and fully mixed. After incubation for 10 min at laboratory conditions, on the test tubes 3 mL of 20% (m/v)  $\text{Na}_2\text{CO}_3$  adding to this solution was stirred and placed in a water bath at 40 °C for 20 min. Samples cooled at laboratory conditions of absorbance at 765 nm were recorded by UV-VIS spectrophotometer. Experiments were repeated three times for each sample. The content of total phenolic was expressed as mg of gallic acid equivalents (GAE)/g dry mass.

#### 2.5. Total flavonoid content (TFCs)

For the total flavonoid content (TFC), the method was used based on Dewanto et al. (2002) with the minor modifications. One milliliter of diluted with suitable solvents of samples were mixed with 150  $\mu\text{L}$   $\text{NaNO}_2$  (15%) and left at laboratory conditions for 5 min before adding 75  $\mu\text{L}$  of  $\text{AlCl}_3$  (10%). After 5 min, 1 mL of  $\text{NaOH}$  (4%) was added. Total volume was adjusted to 5 ml with the addition of distilled water and in a good way mixed. The total flavonoid content in the examples was measured spectrophotometrically (UV-Vis) at 415 nm. Different concentrations of quercetin (15–480  $\mu\text{g}/\text{mL}$ ) were used for calibration. The quantification was carried out using a calibration curve. The results were expressed in mg quercetin equivalents (QEE)/g dry mass as mean of tree replicates.

#### 2.6. Antioxidant Capacity by the ferric thiocyanate (FTC) method

Inhibition of lipid peroxidation of samples was determined according to the ferric thiocyanate method as reported by Osawa and Namiki (1981) with some modifications. Each test tube contained 2 ml of samples at 250  $\mu\text{g}/\text{ml}$  concentrations, 2 ml an emulsion of linoleic acid in ethanol (2.51 %; v/v), 4 mL of phosphate buffer (0.05M; pH 7.0) and 2 ml of distilled water. The solution (10 mL) was mixed and incubated in an oven at 40 °C in dark for 10 day. The same solution, without any additives was taken as control samples. At regular intervals during incubation, 0.1 mL aliquot of the mixture was diluted with 9.7 mL of ethanol (75 %) followed by the addition of 0.2 ml of ammonium thiocyanate (30 %) and 0.1 ml of ferrous chloride (20 mM) in hydrochloric acid (3.5 %; v/v). The peroxide level of each sample was determined by reading absorbance at 500 nm spectrophotometrically. These steps are repeated every 24 h until the control sample reached its maximum. The low absorbance value indicates the efficiency of the test samples to inhibit lipid oxidation. Percent inhibition of lipid peroxidation is calculated by formula: inhibition of lipid peroxidation (%) =  $(1 - S_{\text{abs}}/C_{\text{abs}}) \times 100$  where  $C_{\text{abs}}$  is the absorbance of the control and  $S_{\text{abs}}$  is the absorbance of the samples.

#### 2.7. Gas chromatography/mass spectrometry (GC/MS)

The essential oil obtained from the aerial parts of *S. byzantina* was analyzed using a Perkin-Elmer GC-MS system. Gas chromatograph equipped with an automatic liquid sampler coupled to a mass selective detector in the electron impact mode (ionization energy: 70 eV). GC analysis was performed on HP-5MS 5% phenylmethylsiloxane capillary column (30 m  $\times$  0.25 mm, i.d., 0.25  $\mu\text{m}$  film thickness) equipped with a flame ionization detector (FID). The oven temperature was set at 60 °C for 2 min initially, followed by an increase of 4 °C/min to 240 °C in a 59 min total run and a solvent delay of 3 min was selected. Injector and detector temperatures were set at 210 °C and 280 °C, respectively. The samples were injected using a volume of 1  $\mu\text{l}$  and used operating in the split mode injection (1:100). Helium was used as a carrier gas at a constant pressure mode (flow rate: 1 ml/min). All mass spectra were recorded in the scan mode at 70 eV (40–550 m/z). Repeatability was verified by analyzing the sample three times and retention indices were calculated for all components using a homologous series of n-alkanes injected in conditions equal to the sample one. The fragmentation patterns of mass spectra were also compared with those stored in the spectrometer database, spectrometric electronic libraries (WILEY, NIST).

#### 2.8. High performance liquid chromatography (HPLC)

Flavone glycosides were analyzed on a Perkin-Elmer HPLC (High performance liquid chromatography) system. Chromatographic separations were performed on a C18 reverse phase column (4.6 mm  $\times$  150 mm, 5  $\mu\text{m}$  40 °C). A mobile phase consisting of two eluents as (A) acetonitrile (HPLC grade) and (B) water: formic acid (95:5, v/v) was used for separation with a gradient elution [0-5th min A:B (10:90), 2-8th min A:B (20:80), 8-16th min A:B (40:60), 16-24th min A:B (50:50), 24-30 th min A:B (30:70), 30-34 th min A:B (10:90)]. The solvent flow rate was adjusted as 1.0 mL min<sup>-1</sup> and the injection volume was 20  $\mu\text{l}$ . Detection was achieved with an UV-visible (UV-Vis) detector. Spectral peaks were recorded at 360 nm for flavone glycosides. Stock standard solutions were prepared at a concentration of 1 mg/ml and stored at 20 °C. Standard solutions were mixed together and injected at a volume of 20  $\mu\text{l}$ . For chromatographic quantification and confirmation of compounds were prepared at different concentrations (10-200  $\mu\text{g}/\text{L}$ ) of each standard. The compounds in each extract were identified by comparing their retention times and UV-Vis spectra in the 360 nm range with authentic standards and the calculations concerning the quantitative analysis were performed with measurement of the peak areas. Repeatability was checked by analyzing the same sample three times, by the same analyst, within the same day.

### 3. Results and Discussion

#### 3.1. Total phenolic and flavonoid contents

Phenolic compounds are an important group of pharmaceutically active compounds and considered as antioxidants in plants (Bors et al., 2001). The phenolic content in different part of the *S. byzantina* found in the range of  $17.9 \pm 0.87$  and  $315.80 \pm 2.34$  mg GAE/g d.m listed in table 1. While the highest phenolic contents of SBF and SBL parts observed with values of  $315.80 \pm 2.34$  ve  $302.93 \pm 1.67$  mg GAE/g d.m, SBS part was analyzed to have the lower phenol content with a value of  $87.61 \pm 3.92$  mg GAE/g d.m. In addition, it was determined that there are significant differences in the total flavonoid content of each organ. The lowest total flavonoid contents were determined in the part of SBR with a value of  $6.76 \pm 1.97$  mg QE/g d.m, but, were the highest in the parts of SBL with a value of  $198.13 \pm 0.56$  mg QE/g d.m. The amount of the total flavonoids content in each organ were determined descending order SBL>SBAP>SBS>SBF>SBR.

Table 1. Total phenolic contents (TPCs), total flavonoid contents (TFCs), antioxidant activity (AA), values and flavon glycoside compounds (C1, C2, C3) amounts of different organ extracts of *S. byzantina*.

	TPC (mg GAE/g d.m)	TFC (mg QE/g d.m)	AA (% IP)	C1	C2 (mg/kg d.m)	C3
<b>SBAP</b>	275.85 ± 0.91	129.85 ± 4.16	55.74 ± 2.02	613.16 ± 0.17	1165.77 ± 3.02	972.43 ± 1.65
<b>SBF</b>	315.80 ± 2.34	66.83 ± 2.68	82.67 ± 0.93	n.d	713.61 ± 0.12	457.87 ± 4.03
<b>SBL</b>	302.93 ± 1.67	198.13 ± 0.56	92.60 ± 4.89	153 ± 3.09	3018.73 ± 2.91	1763.80 ± 4.65
<b>SBS</b>	17.9 ± 0.87	101.52 ± 3.05	24.82 ± 2.78	n.d	294 ± 1.81	107.51 ± 1.38
<b>SBR</b>	87.61 ± 3.92	6.76 ± 1.97	44.24 ± 3.04	n.d	n.d	n.d
<b>EOs</b>	n.d	n.d	71.13 ± 0.52	n.d	n.d	n.d
<b>C1</b>	n.d	n.d	75.96 ± 2.65	n.d	n.d	n.d
<b>C2</b>	n.d	n.d	66.30 ± 0.03	n.d	n.d	n.d
<b>C3</b>	n.d	n.d	35.53 ± 3.92	n.d	n.d	n.d

Abbreviations: GAE: gallic acid equivalent QE: quercetin equivalent, d.m: dry mass, IP: inhibition percentage, C1: Apigenin 7-O-β-D-(6''-trans-p-coumaroyl) glucoside C2: Isoscutellarein 7-O-[β-D allopyranosyl-(1→2)-6''-O-acetyl-β-O-glucopyranoside] C3: 4'-O-Methyl Isoscutellarein 7-O-[β-D-allopyranosyl (1→2)-6''-O-acetyl-β-O-glucopyranoside].

### 3.2. Quantitative analysis of compounds by HPLC

We have previously reported isolation and chemical structural characterization of flavone glycosides (C1, C2 and C3) from the aerial parts of *S. byzantina* (Demirtas et al., 2013). The comparison of antioxidant activities and the quantitative distribution to each organ of *S. byzantina* of these compounds has not yet been reported. The distribution to each organ of flavone glycosides quantitatively were analyzed by HPLC given in table 1 and HPLC chromatogram was shown in figure 1. The result of the quantitative analysis by HPLC spectrophotometer compound C1 were not detected in the root and flower organs while compound C2 and C3 in the stem organs. Compound C2 was analyzed in the most amount in the SBL organs (3018.73 ± 2.91 mg/kg d.m) while in a minimum quantity in the SBS organs (294 ± 1.81 mg/kg d.m). On the other hand, all three compounds (C1, C2 and C3) not defined in the SBR portion. From the analysis results can be concluded that flavonoid compounds focus more leaves and flower parts.

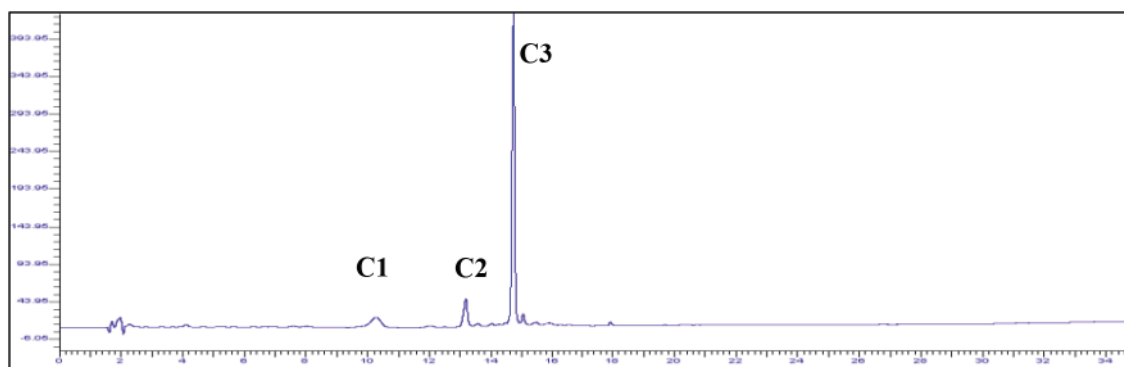


Fig.1. HPLC chromatogram of flavone glycosides C1: Apigenin 7-O-β-D-(6''-trans-p-coumaroyl) glucoside C2: Isoscutellarein 7-O-[β-D allopyranosyl-(1→2)-6''-O-acetyl-β-O-glucopyranoside] C3: 4'-O-Methyl Isoscutellarein 7-O-[β-D-allopyranosyl (1→2)-6''-O-acetyl-β-O-glucopyranoside].

### 3.3. Chemical composition of *S. byzantina* for EOs

Essential oils (EOs) from aerial parts of *S. byzantina* obtained by steam distillation a total of 50 components were analyzed in the ratio 96.4% by GC/MS and GC/FID from the peak area and the analysis results are listed in table 2. We've analyzed that EOs compositions contain 18 oxygenated monoterpenes (56.78%), 11 sesquiterpene hydrocarbons (17.23%), 9 oxygenated sesquiterpenes (9.96%), 6 monoterpenes (9.49%), traces of the ketones (1.45%), aldehydes (0.9%), alcohol (0.42%) and simple hydrocarbons (0.17%). In the previous literature studies it was seen that divided into two major groups containing compounds of monoterpene and sesquiterpene in *Stachys* species. In our study, it was analyzed as the main component, which oxygenated monoterpenes, *cis-p*-Mentha-2,8-dienol (23.68%), *trans*-Chrysanthenyl acetate (12.41%) and thymol (10.12%). Sabinene ve pinocampnone monoterpenes have been previously reported as a major components *Stachys* species grown in different localities. This difference may possibly be due to differences in localities and the analysis conditions, because the extraction procedure, collection time, climate, soil quality and the stress conditions are able to change the distribution of secondary metabolites.

Table 2. Essential oil composition of *S. byzantina*

Compound Name	Formula	RT	RI	% Area
<b>Alcohols</b>				<b>0.42</b>
beta-butoxyethanol	C <sub>6</sub> H <sub>14</sub> O <sub>2</sub>	5.17	888	0.42
<b>Hydrocarbones</b>				<b>0.17</b>
o-xylene	C <sub>8</sub> H <sub>10</sub>	4.48	838	0.17
<b>Aldehydes</b>				<b>0.9</b>
benzaldehyt	C <sub>7</sub> H <sub>6</sub> O	6.34	937	0.41
nonanal	C <sub>9</sub> H <sub>18</sub> O	10.07	1065	0.49
<b>Ketones</b>				<b>1.45</b>
Geranyl acetone	C <sub>13</sub> H <sub>22</sub> O	18.19	1277	0.29
Hexahydrofarnesyl acetone	C <sub>18</sub> H <sub>36</sub> O	23.19	1387	1.16
<b>Monoterpenes</b>				<b>9.49</b>
alpha-pinen	C <sub>10</sub> H <sub>16</sub>	5.79	911	2.25
<b>beta pinen</b>	<b>C<sub>10</sub>H<sub>16</sub></b>	<b>6.79</b>	<b>955</b>	<b>4.45</b>
beta mycrene	C <sub>10</sub> H <sub>16</sub>	7.11	967	0.36
beta cymene	C <sub>10</sub> H <sub>14</sub>	7.95	996	1.02
limonene	C <sub>10</sub> H <sub>16</sub>	8.07	999	1.01
gama terpinen	C <sub>10</sub> H <sub>16</sub>	8.86	1036	0.41
<b>Oxygenated monoterpenes</b>				<b>56.78</b>
eucalyptol	C <sub>10</sub> H <sub>18</sub> O	8.14	1015	0.24
linelaol	C <sub>10</sub> H <sub>18</sub> O	9.97	1063	0.50
alpha-campholenal	C <sub>10</sub> H <sub>16</sub> O	10.68	1079	0.29
isocyclocitral	C <sub>10</sub> H <sub>16</sub> O	10.96	1084	0.25
isopinocarveol	C <sub>10</sub> H <sub>16</sub> O	11.06	1086	0.23
3-Cyclohexene-1-carboxaldehyde, 2,4,6-trimethyl-	C <sub>10</sub> H <sub>16</sub> O	11.71	1099	1.23
alfa Phellandren-8-ol	C <sub>10</sub> H <sub>16</sub> O	11.81	1135	0.20
4-Terpineol	C <sub>10</sub> H <sub>18</sub> O	12.11	1140	0.14
alpha-Terpineol	C <sub>10</sub> H <sub>18</sub> O	12.48	1147	0.18
carvone	C <sub>10</sub> H <sub>16</sub> O	12.64	1150	1.13
decanal	C <sub>10</sub> H <sub>20</sub> O	12.86	1154	0.15
trans-3(10)-Caren-2-ol	C <sub>10</sub> H <sub>16</sub> O	13.03	1157	0.95
(+)-Carvone	C <sub>10</sub> H <sub>14</sub> O	13.94	1171	4.08
<b>Thymol</b>	<b>C<sub>10</sub>H<sub>14</sub>O</b>	<b>15.19</b>	<b>1190</b>	<b>10.12</b>
p-thymol	C <sub>10</sub> H <sub>14</sub> O	15.43	1193	0.24
<b>cis-p-Mentha-2,8-dienol</b>	<b>C<sub>10</sub>H<sub>16</sub>O</b>	<b>15.60</b>	<b>1195</b>	<b>23.68</b>
<b>trans-Chrysanthenyl Acetate</b>	<b>C<sub>12</sub>H<sub>18</sub>O<sub>2</sub></b>	<b>14.44</b>	<b>1179</b>	<b>12.41</b>
isopulegol acetate	C <sub>12</sub> H <sub>20</sub> O <sub>2</sub>	15.96	1248	0.39
Octyl pivalate	C <sub>13</sub> H <sub>26</sub> O <sub>2</sub>	17.88	1273	0.39
<b>Oxygenated sesquiterpenes</b>				<b>9.96</b>
trans-Nerolidol	C <sub>15</sub> H <sub>26</sub> O	17.30	1266	0.59
D-nerolidol	C <sub>15</sub> H <sub>26</sub> O	19.85	1295	0.83
Spathulenol	C <sub>15</sub> H <sub>24</sub> O	20.13	1298	1.61
Caryophyllene oxide	C <sub>15</sub> H <sub>24</sub> O	20.21	1299	0.58
Dihydro-cis-alpha-copaene-8-ol	C <sub>15</sub> H <sub>26</sub> O	20.33	1359	0.33
tau-cadinol	C <sub>15</sub> H <sub>26</sub> O	20.94	1365	0.23
alpha cadinol	C <sub>15</sub> H <sub>26</sub> O	21.11	1367	0.63
Valeranone. (+)-	C <sub>15</sub> H <sub>26</sub> O	21.38	1370	4.51
(+,-)-E-Nuciferol	C <sub>15</sub> H <sub>22</sub> O	25.52	1474	0.65

<i>Sesquiterpene hydrocarbons</i>				<b>17.23</b>
alpha-Cubebene	C <sub>15</sub> H <sub>24</sub>	16.92	1261	0.29
alpha-Bourbonene	C <sub>15</sub> H <sub>24</sub>	17.09	1263	1.63
Caryophyllene	C <sub>15</sub> H <sub>24</sub>	17.71	1271	0.86
beta-Sesquiphellandrene	C <sub>15</sub> H <sub>24</sub>	18.07	1275	1.79
beta farnesene	C <sub>15</sub> H <sub>24</sub>	18.27	1278	0.85
2.8-Dimethylundecane	C <sub>13</sub> H <sub>28</sub>	18.33	1278	0.20
alpha-Bergamotene	C <sub>15</sub> H <sub>24</sub>	18.64	1282	0.29
Germacrene D	C <sub>15</sub> H <sub>24</sub>	18.74	1283	3.24
gamma Elemene	C <sub>15</sub> H <sub>24</sub>	18.95	1285	0.33
Dysoxylonene	C <sub>15</sub> H <sub>24</sub>	19.32	1290	0.84
<b>alpha-Curcumene</b>	<b>C<sub>15</sub>H<sub>22</sub></b>	<b>24.40</b>	<b>1398</b>	<b>6.91</b>
<i>Total identified</i>				<b>96.4</b>

Components are listed in order of elution in apolar column (HP-5). Bold values correspond to the major compounds of the essential oils. RI, retention indices calculated against n-alkanes, RT, retention time

### 3.4. Antioxidant Capacity

According to the ferric thiocyanate (FTC) method, the amount of peroxidation was formed in the linoleic acid emulsion system during the incubation period. The peroxides formed in the test medium transform to ferric chloride (FeCl<sub>3</sub>) or ferrous chloride (FeCl<sub>2</sub>). According to the method, the low absorbance refers to the highest antioxidant capacity (figure 2). The flavone glycosides (C1, C2 and C3), EOs and methanolic extracts of different organs (SBS, SBF, SBR, SBL, SBAP) were exhibited inhibiting capacity to lipid peroxidation according to the ferric thiocyanate (FTC) method at the end of 10 days at a concentration of 250 µg/mL shown in the table. The SBL portion was found to exhibit the highest antioxidant activity when SBS (24.82 ± 2.78%). SBF (82.67 ± 0.93%). SBR (44.24 ± 3.04%), SBAP (55.74 ± 2.02%) portions. The C1 (75.96 ± 2.65%). C2 (66.30 ± 0.03%). C3 (35.53 ± 3.92%) compounds and EOs (71.13 ± 0.52%) were compared with SBL (92.60 ± 4.89%). These results attributed to compounds C2 and C3 available abundantly in the SBL part due to destroy of peroxide formation and free radicals in the test medium. Some significant tissue damages are prevented by reducing the amount of peroxide can be formed in the body (Aiyegoro and Okoh, 2009).

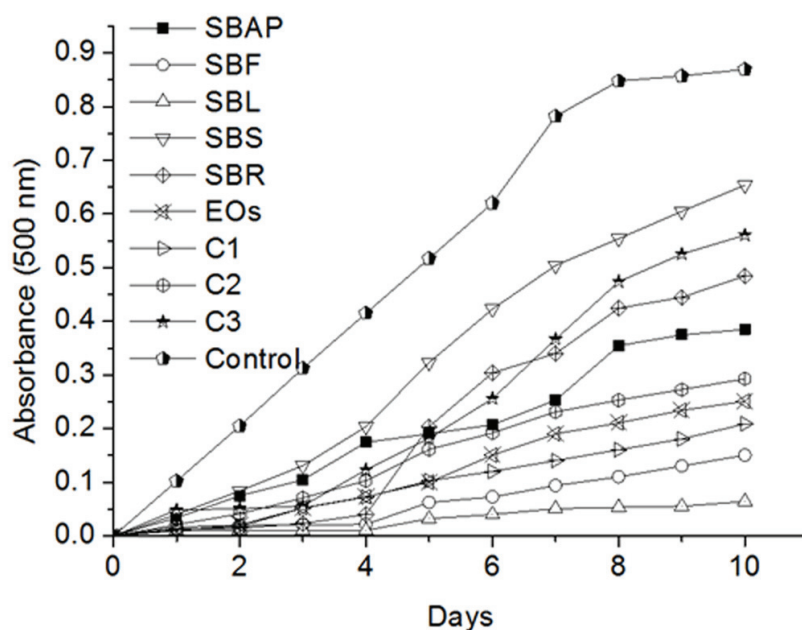


Fig. 2. Antioxidant activity of stems (SBS), flowers (SBF), leaves (SBL), root (SBR) and aerial parts (SBAP), essential oils. Apigenin 7-O-β-D-(6''-trans-p-coumaroyl) glucoside (C1). Isoscutellarein 7-O-[β-D allopyranosyl-(1→2)-6''-O-acetyl-β-O-glucopyranoside] (C2) and 4'-O-Methyl Isoscutellarein 7-O-[β-D-allopyranosyl (1→2)-6''-O-acetyl-β-O-glucopyranoside] (C3). A low absorbance value represents a high level of antioxidant activity.



#### 4. Conclusions

The bioactive compounds present in the plants with medicinal value contributed to antioxidant activity are generally different distribution to each organ of the plant. In our experiments determined in the SBL remarkable amount of TPCs and TFCs with values of  $302.93 \pm 1.67$  GAE/g d.m and  $198.13 \pm 0.56$  QE/g d.m respectively and among these a positive correlation was observed in terms of antioxidant activity. Thus, our study showed that the bioactive components of plants distributed to each organ as the heterogeneous and antioxidant activity was determined proportionally correlated with quantitative amount of this distribution.

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## OFP-019

## Fuzzy Logic and Dempster-Shafer Theory to Detect the Risk of Disease Spreading of African Trypanosomiasis

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### Abstract

This research offers some insight on the risk of disease spreading. Integrating Fuzzy Logic and Dempster-Shafer theory by calculating the similarity between Fuzzy membership function in the context to detect the risk of disease spreading of African Trypanosomiasis and finally to develop a realistic and useful Web mapping for displaying maps on a screen to locate the risk of disease spreading. The risk of disease spreading is not classified according to higher density which is equal to higher risk. This research has considered population changes in an area to detect the risk of disease spreading. The experts provide opinion in terms of basic probability assignment for interval or crisp focal elements. Those basic probability assignments are proposed based on the similarity measure between membership function. The similarity between Fuzzy membership function is calculated to get basic probability assignment. The highest percentage of the risk of disease spreading of African Trypanosomiasis is 17%. In Angola and Zambia, the highest basic probability assignment of the risk of disease spreading of African Trypanosomiasis is very low which is equal to 0.173. The risk of disease spreading of African Trypanosomiasis in areas which include Angola, Botswana, Congo, Congo DRC, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe.

### 1. Introduction

Neglected tropical diseases kill an estimated 534,000 people worldwide every year (WHO, 2009). World Health Organization reports that African Trypanosomiasis affects mostly poor populations living in remote rural areas of Africa that can be fatal if not properly treated. Sustainable elimination of African Trypanosomiasis as a public-health problem is feasible and requires continuous efforts and innovative approaches. Human African Trypanosomiasis is a disease of poor rural communities caused by extracellular protozoan parasites of the genus *Trypanosoma*. African Trypanosomiasis is an infectious disease of humans and animals of similar aetiology and epidemiology (Dietmar, 2008). The causative agents of the disease are protozoan parasites of the genus *Trypanosoma* that live and multiply extracellularly in blood and tissue fluids of their mammalian hosts and are transmitted by the bite of infected tsetse flies (*Glossina sp.*). The distribution of Trypanosomiasis in Africa corresponds to the range of tsetse flies and comprises currently an area of 8 million km<sup>2</sup> between 14 degrees North and 20 degrees South latitude (Molyneux, 1996). Throughout history, African Trypanosomiasis has severely repressed the economic and cultural development of Central Africa. The African Trypanosomiasis develops in areas ranging from a single village to an entire region. Within an infected area, the intensity of the disease can vary from one village to the next. Between 2000 and 2009, out of 36 countries listed as endemic, 24 received the exclusive support of WHO (World Health Organization) either to assess the epidemiological status of human African Trypanosomiasis or to establish control and surveillance activities (Simaro, 2011). Sandfly species transmit the disease leishmaniasis, by acting as vectors for protozoan *Leishmania* species, and tsetse flies transmit protozoan trypanosomes (*Trypanosoma brucei gambiense* and *Trypanosoma brucei rhodesiense*) which cause African Trypanosomiasis (sleeping sickness).

Population density affect the disease spreading within a population and other populations because a population that is very dense will generally see a faster disease spreading due to the larger amount of contact between individuals. In a population that is not very dense, close contact is much less likely to occur, thus halting the disease spreading. Population density is measured by the average of the number of contacts with susceptible individuals by each individual in the population during a fixed length time period (Tarwater, 2001). Population density and growth are significant drivers for the emergence of different categories of infectious diseases (Jones, 2008). Most diseases require that their host organisms come into close contact with another compatible organism in order to spread, meaning that denser populations of suitable hosts promote faster spread of a disease and that less-dense populations inhibit disease communication. Because disease prevention relies so heavily on contact between potential carriers, lower population densities have an increased chance of controlling disease spreading. Fuzzy set theory proposed by Zadeh in 1965 (Zadeh, 1965) is a kind of theoretical reasoning scheme for dealing with imperfect data. A Fuzzy set, as the name implies, is a set without a crisp boundary. That is, the transition is gradual and this smooth transition is characterized by membership functions. Shafer (Shafer, 1976) developed Dempster's works (Dempster, 1967), (Dempster, 1968) in 1976 and presented evidence theory, also called Dempster-Shafer theory of evidence. The Dempster-Shafer theory of evidence was developed to model uncertainties. The main concept of evidence theory is that our knowledge of a given problem can be inherently imprecise.

### 2. Fuzzy Logic and Dempster-Shafer Theory to The Risk of Disease Spreading of African Trypanosomiasis

On the basis of the description of input and output variables, this research has constructed 25 rules for the risk of disease spreading of African Trypanosomiasis. The Fuzzy rules are nearly a series of if-then statements. These statements are derived by an expert to achieve optimum results. Rule matrix suggest how the risk of disease spreading of African Trypanosomiasis should be changed is shown in Figure 1. For examples, following is the description of the rules of the risk of disease spreading of African Trypanosomiasis:

1. IF Area1 Density is [Very Low] AND Area2 Density is [Very High] THEN The Risk of Disease Spreading should be [High]
2. IF Area1 Density is [Very Low] AND Area2 Density is [High] THEN The Risk of Disease Spreading should be [Low]
3. IF Area1 Density is [Very Low] AND Area2 Density is [Medium] THEN The Risk of Disease Spreading should be [Very Low]
4. IF Area1 Density is [Very Low] AND Area2 Density is [Low] THEN The Risk of Disease Spreading should be [Very Low]
5. IF Area1 Density is [Very Low] AND Area2 Density is [Very Low] THEN The Risk of Disease Spreading should be [Very Low]

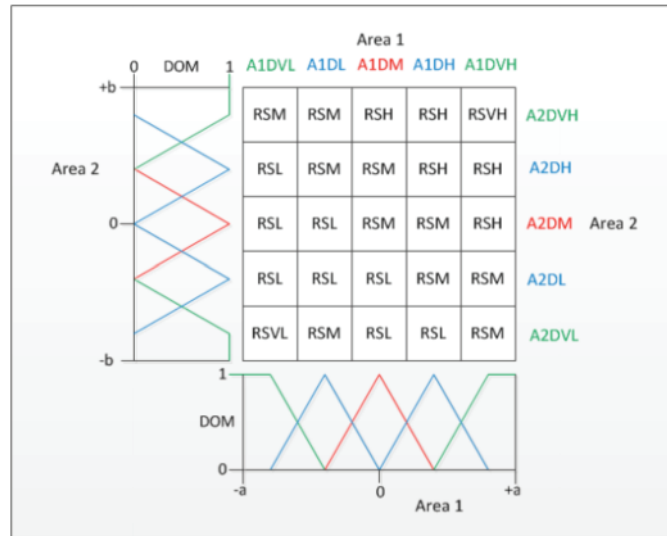


Fig 1. Rule matrix of the risk of disease spreading of African Trypanosomiasis

There are two input variables which include Area1 and Area2 taken in this Fuzzy system. Area1 is a Fuzzy range of population density in Angola and Area2 is a Fuzzy range of population density in Zambia. These variables use different membership functions. Area1 functions which include Area1<sub>very low</sub>, Area1<sub>low</sub>, Area1<sub>medium</sub>, Area1<sub>high</sub>, Area1<sub>very high</sub>. Area2 functions which include Area2<sub>very low</sub>, Area2<sub>low</sub>, Area2<sub>medium</sub>, Area2<sub>high</sub>, Area2<sub>very high</sub>. Fuzzy ranges of population density of two areas in Africa to detect the risk of disease spreading of African Trypanosomiasis can be defined as follows:

Area1<sub>very low</sub> = 10,000; Area1<sub>low</sub> = 13,000; Area1<sub>medium</sub> = 16,000; Area1<sub>high</sub> = 19,000; Area1<sub>very high</sub> = 22,000.  
 Area2<sub>very low</sub> = 8,000; Area2<sub>low</sub> = 10,000; Area2<sub>medium</sub> = 12,000; Area2<sub>high</sub> = 14,000; Area2<sub>very high</sub> = 16,000.

**Area1 of African Trypanosomiasis**

Area1<sub>very low</sub> is used to define the variable very low. The weight is calculated by the following formula:

$$\mu(\text{Area1}_{\text{very low}}[x]) = \begin{cases} 1, & x \leq 10,000 \\ \frac{13,000-x}{13,000-10,000}, & 10,000 \leq x \leq 13,000 \\ 0, & x \geq 13,000 \end{cases}$$

Area1<sub>low</sub> is used to define the variable low. The weight is calculated by the following formula:

$$\mu(\text{Area1}_{\text{low}}[x]) = \begin{cases} 0, & x \leq 10,000 \text{ or } x \geq 16,000 \\ \frac{x-10,000}{13,000-10,000}, & 10,000 \leq x \leq 13,000 \\ \frac{16,000-x}{16,000-13,000}, & 13,000 \leq x \leq 16,000 \end{cases}$$

Area1<sub>medium</sub> is used to define the variable medium. The weight is calculated by the following formula:

$$\mu(\text{Area1}_{\text{medium}}[x]) = \begin{cases} 0, & x \leq 13,000 \text{ or } x \geq 19,000 \\ \frac{x-13,000}{16,000-13,000}, & 13,000 \leq x \leq 16,000 \\ \frac{19,000-x}{19,000-16,000}, & 16,000 \leq x \leq 19,000 \end{cases}$$

Area1<sub>high</sub> is used to define the variable high. The weight is calculated by the following formula:

$$\mu(\text{Area1}_{\text{high}}[x]) = \begin{cases} 0, & x \leq 16,000 \text{ or } x \geq 22,000 \\ \frac{x-16,000}{19,000-16,000}, & 16,000 \leq x \leq 19,000 \\ \frac{22,000-x}{22,000-19,000}, & 19,000 \leq x \leq 22,000 \end{cases}$$

Area1<sub>very high</sub> is used to define the variable very high. The weight is calculated by the following formula:

$$\mu(\text{Area1}_{\text{very high}}[x]) = \begin{cases} 0, & x \leq 19,000 \\ \frac{x-19,000}{22,000-19,000}, & 19,000 \leq x \leq 22,000 \\ 1, & x \geq 22,000 \end{cases}$$

### Area2 of African Trypanosomiasis

Area2<sub>very low</sub> is used to define the variable very low. The weight is calculated by the following formula:

$$\mu(\text{Area2}_{\text{very low}}[y]) = \begin{cases} 1, & y \leq 8,000 \\ \frac{10,000-y}{10,000-8,000}, & 8,000 \leq y \leq 10,000 \\ 0, & y \geq 10,000 \end{cases}$$

Area2<sub>low</sub> is used to define the variable low. The weight is calculated by the following formula:

$$\mu(\text{Area2}_{\text{low}}[y]) = \begin{cases} 0, & y \leq 8,000 \text{ or } y \geq 12,000 \\ \frac{y-8,000}{10,000-8,000}, & 8,000 \leq y \leq 10,000 \\ \frac{12,000-y}{12,000-10,000}, & 10,000 \leq y \leq 12,000 \end{cases}$$

Area2<sub>medium</sub> is used to define the variable medium. The weight is calculated by the following formula:

$$\mu(\text{Area2}_{\text{medium}}[y]) = \begin{cases} 0, & y \leq 10,000 \text{ or } y \geq 14,000 \\ \frac{y-10,000}{12,000-10,000}, & 10,000 \leq y \leq 12,000 \\ \frac{14,000-y}{14,000-12,000}, & 12,000 \leq y \leq 14,000 \end{cases}$$

Area2<sub>high</sub> is used to define the variable high. The weight is calculated by the following formula:

$$\mu(\text{Area2}_{\text{high}}[y]) = \begin{cases} 0, & y \leq 12,000 \text{ or } y \geq 16,000 \\ \frac{y-12,000}{14,000-12,000}, & 12,000 \leq y \leq 14,000 \\ \frac{16,000-y}{16,000-14,000}, & 14,000 \leq y \leq 16,000 \end{cases}$$

Area2<sub>very high</sub> is used to define the variable very high. The weight is calculated by the following formula:

$$\mu(\text{Area2}_{\text{very high}}[y]) = \begin{cases} 0, & y \leq 14,000 \\ \frac{y-14,000}{16,000-14,000}, & 14,000 \leq y \leq 16,000 \\ 1, & y \geq 16,000 \end{cases}$$

Assume that the population density for inputs to detect the risk of disease spreading of African Trypanosomiasis can be defined as follows:

Area1<sub>very low</sub> = 11,500; Area1<sub>low</sub> = 13,500; Area1<sub>medium</sub> = 16,500; Area1<sub>high</sub> = 18,000; Area1<sub>very high</sub> = 21,000  
 Area2<sub>very low</sub> = 9,000; Area2<sub>low</sub> = 11,500; Area2<sub>medium</sub> = 12,500; Area2<sub>high</sub> = 12,750; Area2<sub>very high</sub> = 14,500

Membership values to detect the risk of disease spreading of African Trypanosomiasis are shown as follows:

Area1<sub>very low</sub> = 0.50; Area1<sub>low</sub> = 0.833; Area1<sub>medium</sub> = 0.833; Area1<sub>high</sub> = 0.666; Area1<sub>very high</sub> = 0.666  
 Area2<sub>very low</sub> = 0.50; Area2<sub>low</sub> = 0.25; Area2<sub>medium</sub> = 0.75; Area2<sub>high</sub> = 0.375; Area2<sub>very high</sub> = 0.25

For examples, the weighting factors of the rules of the risk of disease spreading of African Trypanosomiasis are calculated as follows:

1. **IF** Area1 Density is [Very Low] **AND** Area2 Density is [Very High] **THEN** The Risk of Disease Spreading should be [High]  
 $\alpha_1 = \mu(A1DVL) \cap \mu(A2DVH)$ ,  $\alpha_1 = \min(\mu(A1DVL)[11,500] \cap \mu(A2DVH)[14,500])$   
 $\alpha_1 = \min(0.50, 0.25)$ ,  $\alpha_1 = 0.25$ ,  $\alpha_1\{RSH\} = 0.25$
2. **IF** Area1 Density is [Very Low] **AND** Area2 Density is [High] **THEN** The Risk of Disease Spreading should be [Low]  
 $\alpha_6 = \mu(A1DVL) \cap \mu(A2DH)$ ,  $\alpha_6 = \min(\mu(A1DVL)[11,500] \cap \mu(A2DH)[12,750])$   
 $\alpha_6 = \min(0.50, 0.375)$ ,  $\alpha_6 = 0.375$ ,  $\alpha_6\{RSL\} = 0.375$
3. **IF** Area1 Density is [Very Low] **AND** Area2 Density is [Medium] **THEN** The Risk of Disease Spreading should be [Very Low]  
 $\alpha_{11} = \mu(A1DVL) \cap \mu(A2DM)$ ,  $\alpha_{11} = \min(\mu(A1DVL)[11,500] \cap \mu(A2DM)[12,500])$   
 $\alpha_{11} = \min(0.50, 0.75)$ ,  $\alpha_{11} = 0.50$ ,  $\alpha_{11}\{RSVL\} = 0.50$
4. **IF** Area1 Density is [Very Low] **AND** Area2 Density is [Low] **THEN** The Risk of Disease Spreading should be [Very Low]  
 $\alpha_{16} = \mu(A1DVL) \cap \mu(A2DL)$ ,  $\alpha_{16} = \min(\mu(A1DVL)[11,500] \cap \mu(A2DL)[11,500])$   
 $\alpha_{16} = \min(0.50, 0.25)$ ,  $\alpha_{16} = 0.25$ ,  $\alpha_{16}\{RSVL\} = 0.25$
5. **IF** Area1 Density is [Very Low] **AND** Area2 Density is [Very Low] **THEN** The Risk of Disease Spreading should be [Very Low]  
 $\alpha_{21} = \mu(A1DVL) \cap \mu(A2DVL)$ ,  $\alpha_{21} = \min(\mu(A1DVL)[11,500] \cap \mu(A2DVL)[9,000])$   
 $\alpha_{21} = \min(0.50, 0.50)$ ,  $\alpha_{21} = 0.50$ ,  $\alpha_{21}\{RSVL\} = 0.50$

The result of African Trypanosomiasis Fuzzy rules between Area1 versus Area2 is shown in Figure 2.

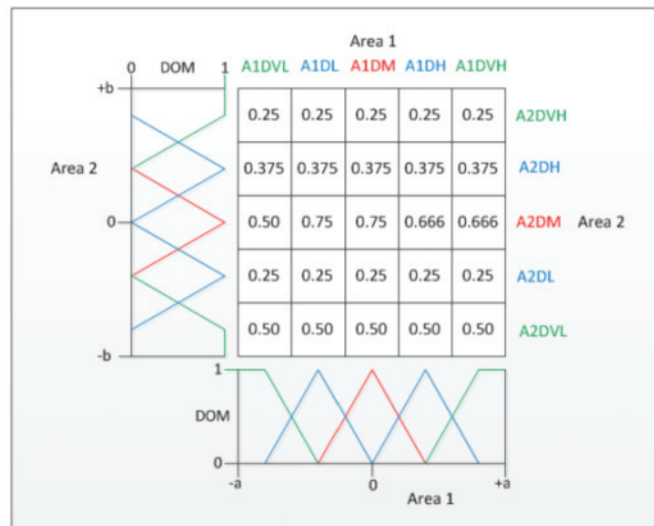


Fig 2. African Trypanosomiasis Rule matrix result

The similarity between Fuzzy membership function to get the basic probability assignment can be calculated as shown below:

$$RSVL = (\alpha_{11} + \alpha_{16} + \alpha_{21} + \alpha_{23})/4 = 0.4375$$

$$RSL = (\alpha_6 + \alpha_{12} + \alpha_{17} + \alpha_{18} + \alpha_{24})/5 = 0.425$$

$$RSM = (\alpha_2 + \alpha_7 + \alpha_8 + \alpha_{13} + \alpha_{19} + \alpha_{22})/6 = 0.4166$$

$$RSH = (\alpha_1 + \alpha_{13} + \alpha_{14} + \alpha_{20} + \alpha_{25})/5 = 0.3832$$

$$RSVH = (\alpha_4 + \alpha_5 + \alpha_9 + \alpha_{10} + \alpha_{15})/5 = 0.3832$$

The risk of disease spreading of African Trypanosomiasis describes five interpretations which include the risk of disease spreading should be very low, the risk of disease spreading should be low, the risk of disease spreading should be medium, the risk of disease spreading should be high, and the risk of disease spreading should be very high. The following will be shown the detection process of the risk of disease spreading of African Trypanosomiasis.

1. The risk of disease spreading should be Very Low (RSVL)  
 $m_1\{RSVL\} = 0.4375$ ,  $m_1\{\Theta\} = 1 - 0.4375 = 0.5625$
2. The risk of disease spreading should be Low (RSL)  
 $m_2\{RSL\} = 0.425$ ,  $m_2\{\Theta\} = 1 - 0.425 = 0.575$

The first two bpas  $m_1$  and  $m_2$  are calculated to yield a new bpa  $m_3$  by a combination rule as follows:

$$m_3\{RSVL\} = 0.2515/(1-0.1859) = 0.3089$$

$$m_3\{RSL\} = 0.2390/(1-0.1859) = 0.2936$$

$$m_3\{\Theta\} = 0.3234/(1-0.1859) = 0.3972$$

3. The risk of disease spreading should be Medium (RSM)

$$m_4\{\text{RSM}\} = 0.4166, m_4\{\Theta\} = 1 - 0.4166 = 0.5834$$

The second two bpas  $m_3$  and  $m_4$  are calculated to yield a new bpa  $m_5$  by a combination rule as follows:

$$m_5\{\text{RSL}\} = 0.1802/1-(0.1287+0.1223) = 0.2405, m_5\{\text{RSL}\} = 0.1713/1-(0.1287+0.1223) = 0.2287,$$

$$m_5\{\text{RSM}\} = 0.1655/1-(0.1287+0.1223) = 0.2209, m_5\{\Theta\} = 0.2317/1-(0.1287+0.1223) = 0.3093$$

4. The risk of disease spreading should be High (RSH)

$$m_6\{\text{RSH}\} = 0.3832, m_6\{\Theta\} = 1 - 0.3832 = 0.6168$$

The third two bpas  $m_5$  and  $m_6$  are calculated to yield a new bpa  $m_7$  by a combination rule as follows:

$$m_7\{\text{RSL}\} = 0.1483/1-(0.0921+0.0876+0.0846) = 0.2016,$$

$$m_7\{\text{RSL}\} = 0.1411/1-(0.0921+0.0876+0.0846) = 0.1918,$$

$$m_7\{\text{RSM}\} = 0.1362/1-(0.0921+0.0876+0.0846) = 0.1851,$$

$$m_7\{\text{RSH}\} = 0.1185/1-(0.0921+0.0876+0.0846) = 0.1611,$$

$$m_7\{\Theta\} = 0.1908/1-(0.0921+0.0876+0.0846) = 0.2593$$

5. The risk of disease spreading should be Very High (RSVH)

$$m_8\{\text{RSVH}\} = 0.3832, m_8\{\Theta\} = 1 - 0.3832 = 0.6168$$

The fourth two bpas  $m_7$  and  $m_8$  are calculated to yield a new bpa  $m_9$  by a combination rule as follows:

$$m_9\{\text{RSL}\} = 0.1243/1-(0.0772+0.0735+0.0709+0.0617) = 0.173,$$

$$m_9\{\text{RSL}\} = 0.1183/1-(0.0772+0.0735+0.0709+0.0617) = 0.1651,$$

$$m_9\{\text{RSM}\} = 0.1141/1-(0.0772+0.0735+0.0709+0.0617) = 0.1592,$$

$$m_9\{\text{RSH}\} = 0.0993/1-(0.0772+0.0735+0.0709+0.0617) = 0.1385,$$

$$m_9\{\text{RSVH}\} = 0.0993/1-(0.0772+0.0735+0.0709+0.0617) = 0.1385,$$

$$m_9\{\Theta\} = 0.1599/1-(0.0772+0.0735+0.0709+0.0617) = 0.2231$$

Finally, in Angola and Zambia, the highest basic probability assignment value is  $m_9\{\text{RSL}\}$  which is equal to 0.173. This means the risk of disease spreading of African Trypanosomiasis is very low. The risk of disease spreading of African Trypanosomiasis in areas which include Angola, Botswana, Congo, Congo DRC, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe. Figure 3 shows the risk of disease spreading of African Trypanosomiasis.

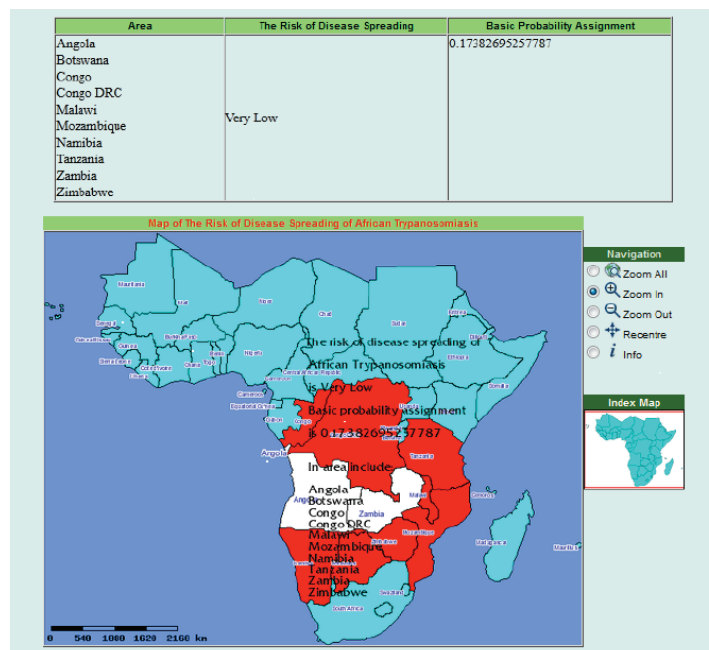


Fig 3. The risk of disease spreading of African Trypanosomiasis

Figure 4 shows graphic of the risk of disease spreading of African Trypanosomiasis in areas which are in close proximity to Angola and Zambia. The highest basic probability assignment is very low which is equal to 0.173. It means the risk of disease spreading of African Trypanosomiasis is very rare but cannot be excluded.

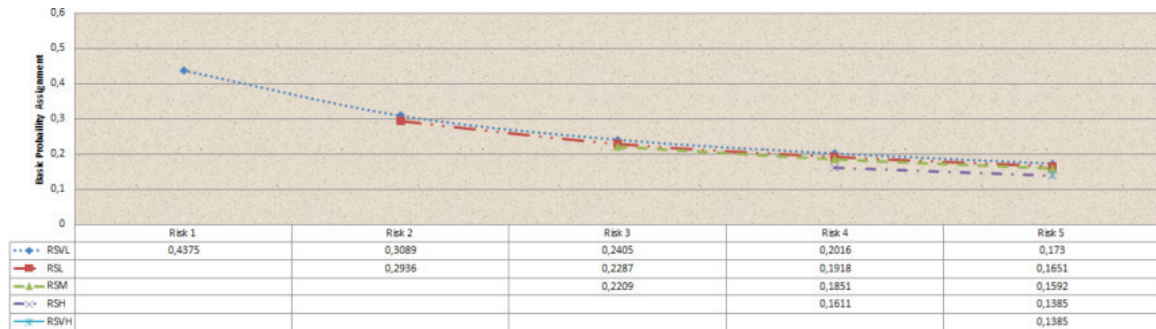


Fig 4. Graphic of the risk of disease spreading of African Trypanosomiasis

### 3. Conclusion

In this study, a novel combination of Fuzzy Logic and Dempster-Shafer mathematical theory of evidence are applied to detect the risk of disease spreading. The risk of disease spreading is not classified according to higher density which is equal to higher risk. This research has considered population changes in an area to detect the risk of disease spreading. Population density in an area can be very low, low, medium, high and very high. Early detection of the risk of disease spreading of human African Trypanosomiasis is important in interrupting the transmission cycle of the parasite and progress of the disease to the late stage. Therefore, cost effective, simple, rapid, robust and reliable methods, are urgently needed. There is also an urgent need for accurate tools for detection of the risk of disease spreading of African Trypanosomiasis, a new initiative for the development of new diagnostic tests to support the control of African Trypanosomiasis.

This system is the provision of timely and effective information, that allows individuals exposed to hazard to take action to avoid or reduce their risk and prepare for effective response. Vagueness, impreciseness and uncertainty are fundamental and indispensable aspects of knowledge, so as in many practical problems, the experts face vagueness in feature vectors and uncertainty in decision-making. Essentially, a symptom is an uncertain indication of a phenomenon as it may or may not occur with it. In other words, uncertainty characterizes a relation between symptoms and phenomena. On the other hand, the feature vectors are usually vague. Hence, uncertainty regards the relation between symptoms and phenomena, whereas vagueness represents impreciseness in the feature vectors. The Dempster-Shafer theory of evidence was developed to model uncertainties. It has the advantage of allocating belief to subsets of the universal set and a combination rule that is able to combine multi-source evidence. This is an exceptional virtue for making decisions when multi-source information is available.

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OFP-020

## Tunisian Wetlands Valuation Elements and Sustainable Development: Case of Sebkhath El Kelbia Sousse Tunisia

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### Abstract

The conservation of wetlands is now regarded as an urgent measure to be implemented for national and intergovernmental strategies. This work tries to take a progressive approach to contemplate a typical wetland "Sebkhath El Kelbia in Sousse-Tunisia". Analytical research based on several disciplinary tools including cartographic interpretation, delimitation of natural landscapes and the archaeo-landscape restoration, through the study of centuriation demonstrates the importance of the area on ecological plan, heritage and landscape. The analysis of this territory wrongly considered "marginal" shows that different interventions (policy, forest and land) interact with each other and act in a direct way the landscape forms and are a must for any planning and / or a territorial reorganization. Landscape parameters are also proposed, which are based on the densification of the vegetation of halophyte and forage type applications compared with farmers in the region. The involvement of differential management of hybrid "agri-entertainment wetland" will be another resource for the enhancement and development of threatened territories.

### 1. Introduction

In Tunisia, the coast has become in recent years a constant concern for the authorities, scientists and even civil society. It is now recognized by all as a collective wealth, a vital and fragile common heritage, under increased pressures particularly on certain portions of the territory. Countries, like all developing countries, coastal management perspective make great efforts. They know as well as industrialized countries alarming phenomena of coastal development and a stressed human impact due to rapid urbanization, the establishment of industrial, port and tourist activities. This results in a clear spatial imbalance in terms of spatial planning (Melhaoui and Sbai, 2008). The coastline of today has a special place in the dynamics of the territories (Donadieu and Rejeb, 2009). It is defined here as a multipurpose space at the land-sea interface, subjected to the combined influence of marine and atmospheric dynamics and contributions of watersheds, natural or anthropogenic origins. It is subject to very high stakes and passionate debate. Eco-social system particularly complex, this coast appears as an ambivalent space, attracting as bearer of wealth and amenities linked to the presence of the sea, but also marked by strong natural and anthropogenic stresses generating rivalries, conflicts and risks (Donadieu and Rejeb, 2011). In response to multiple environmental crises around the world, enhanced by technologies increasingly disconnected from Nature, biodiversity, including its plant component (first link of the food chains), is now recognized as a vital and common good to all. Gradually, man has become aware of the impact its activities lead on biodiversity and the need for its protection (Babillot, 2006). While it is now clear evidence that the conservation of biodiversity is a priority measure to be implemented in all human developments, processes for its maintenance are less well known (Rejeb, 2006). In this context, we propose to contribute to the knowledge of the most exhaustive inventory possible to wetland biodiversity but also on interactions between human systems and biodiversity, through the study of the dynamics of biodiversity in landscapes of wetlands, revealing the factors responsible for this dynamic (Stephan, 2006). The landscape, as well as other research topics, received a major and recent developments in archeology. This transformation is due to the new position held by prospecting in all archaeological gestures. Since the advent of aerial photography in archeology use of photographic and planimetric took a considerable place in research on sites and landscapes. Because of the complexity of the dynamics at play, modeling seems appropriate to develop hypotheses on interactions actors environment, with a view to better understanding the interconnectedness of systems studied and the spatial and temporal scales. That is why the study of the evolution of landscapes the turn of the Tunisian Sahel wetlands has to go through an understanding of the ecosystems of a historical context from Roman times through the study of the Roman centuriation in Tunisia so far, including the joint between the old management practices and the environment (Villaescusa Gonzalez, 1996). Thus, this study hybrid between hydrography and ancient boundaries is a fundamental point, which shows a true mastery of hydrology since Roman times and allows us to infer and affirm if centuriations being drainage and discharge structures water to nearby wetlands or irrigation structures that enable the management of water flows and therefore to exploit the maximum possible farmland around the wetlands in the Sahel region (Ben Haj Farhat and Rejeb, 2012). Most Mediterranean wetlands, including salt pans, are subject to various economic valuations for centuries. Reed harvesting, grazing, hunting or conservation projects of some animal species with strong assets are the source of management practices that interact and are likely to have long-term negative effects (Perennou and Mesléard, 1996). Also, understand and predict how these spaces, and biodiversity that is subservient to them, respond to natural and human-induced changes is an important issue for the conservation of wetlands Tunisian.

### 2. Literature Review And Hypotheses

The landscape is a dynamic geographic area composed of interacting ecosystems (terrestrial, aquatic ecosystems and urban) (Aghzar, 2006). Ecosystems are dynamic sets of living organisms (plants, animals and microorganisms) that interact with each other and the environment (soil, climate, water, light) in which they live. Landscape structure results from interactions between environmental phenomena and human interventions (past and present) (Floch and Candau 2001). In recent decades, urbanization and intensification of agriculture have made serious violations of terrestrial and aquatic ecosystems. Therefore, the landscape has undergone profound changes which are resultant of the Space Human / Nature interactions (Hollard and Smadja, 1993). In Tunisia, the coast has become in recent years a constant concern for the authorities, scientists and even civil society. It is now recognized by all as a collective wealth, a vital and fragile common heritage, under increased pressures particularly on certain portions of the territory. Countries, like all developing countries, coastal management perspective make great efforts. They know as well as industrialized countries alarming phenomena of coastal development and a stressed human impact due to rapid urbanization, the establishment of industrial, port and tourist activities. This results in a clear



spatial imbalance in terms of spatial planning (Melhaoui and Sbai, 2008). The coastline of today has a special place in the dynamics of the territories (Donadieu and Rejeb, 2009). It is defined here as a multipurpose space at the land-sea interface, subjected to the combined influence of marine and atmospheric dynamics and contributions of watersheds, natural or anthropogenic origins. It is subject to very high stakes and passionate debate. Eco-social system particularly complex, this coast appears as an ambivalent space, attracting as bearer of wealth and amenities linked to the presence of the sea, but also marked by strong natural and anthropogenic stresses generating rivalries, conflicts and risks (Donadieu and Rejeb, 2011).

Studies on the theme of reclaiming wetlands show a deviation from the study landscape a sense of decor, formal and aesthetic significance, toward a meaning in terms of living environment, and for that the emergence of environmental concerns and certainly social engine (Bonin 2007). Most Mediterranean wetlands are subject to various economic valuations for centuries. Reed harvesting, grazing, hunting or conservation projects of some animal species with strong assets are the source of management practices that interact and are likely to have long-term negative effects (Perennou and Mesleard, 1996). Also, understand and predict how these spaces, and biodiversity that is subservient to them, respond to natural and human-induced changes is an important issue for the conservation of wetlands Tunisian. The spatio-temporal dynamics of biological, physical and social humanized and natural landscapes, is studied landscape ecology (European Agency for the Environment, 2006). The ecology of the landscape projects cover a wide range of issues ranging from the analysis of environmental risks in the study of biodiversity through the development of management strategies and development of socially acceptable space and observation of public attitudes to changes in the landscape (Schwal, 2004). Recent studies on the changing landscape have highlighted changes in land use since the recent Prehistory and the increasing role of human societies in these changes. It was shown that deforestation has played an important role in the degradation and disruption of many forest ecosystems (Venema and al., 2005). Other studies have raised the involvement of the global warming problem in the world in the destabilization of ecosystems (Julliard and al., 2004). Moreover, environmental aggression is linked to other causes such as climate change (Pearson and al, 2005) and overexploitation (Pauly and al., 2003). Finally, to strengthen scientific knowledge relating to fields of conservation and management of natural ecosystems, it is necessary to conduct studies and research on the dynamics of biodiversity and landscape change based on methods and modern techniques such as geo-spatial analysis. The results will reveal the factors responsible for this dynamic and discuss the wider issues about the proposed developments in the future and how to implement first. From these data, we will, at the end of our research, propose conservative management databases landscapes in wetlands and advance elements of reflection on the conservation of habitats (spatial organization, maintenance) and species (abundance, distribution). Threats increasingly on Wetlands raise the question to what extent the strong cultural landscapes may present a certain level of biodiversity. In this context, understanding the factors responsible for the establishment and maintenance of biodiversity (flora and fauna) is fundamental. Thus, based on spatial analysis and morpho-based archaeological analysis centuriations, we will try to model the evolution of the landscape potential in areas of study through the simulation of changes in use and occupancy soil and landscape structures by considering the natural forcings and human decisions that occur at different scales. These natural areas located near large cities and having ecological potential that arouse public interest (landscape, recreational, archaeological value) it will be a repositioning of mediator city compared to surrounding nature areas (marginal areas and sensitive)? Our hypothesis is as follows, natural and anthropogenic factors act differently for the acceleration of reversible or irreversible transformation of environments and their natural resources. The overall continued operation of Mediterranean wetlands and their biodiversity is based on the assessment of status and trends of these habitats in terms of current latent biophysics, and biodiversity they host, and identify the causes of changes and enhance the utility nature of these environments for human beings. According to this hypothesis, we can identify three factors potentially responsible for landscape change of wetlands:

- i- natural factors that build and destroy their own landscapes (climate, soil type, relief) and to which are added the amputation of landscape practices.
- ii- spatial boundaries factors that are expressed in terms of landscape structures and their differentiations (surface, shape, fragmentation, heterogeneity).
- iii- the rur-urban anthropogenic factors materialized particularly through the development of human activities (agricultural practices, urbanization, uses). Although we make the distinction between these three factors, it is worth noting the major influence of anthropogenic factors on the other two factors. In particular, human factors are the source of almost all the characteristics of spatial factors.

### 3. Methodology

*Research Goal:* The sebkhah El Kelbia, is a vast natural depression of 15000 Ha, Ha, 8000 Constituting the lake (pond) and 7000 ha surrounding swamps (ABDELHAMID and al, 1997). All of the land is Declared as a nature reserve (Decree of the Minister of Agriculture of 18 December 1993). These lands belong to the public water (DPH) are Placed outside the cadastre. By icts geographical location, the Sebkhah El Kelbia is the culmination of major flows from the center and Provides occasional communication with the sea. This peculiarity HAS Attracted always the focus of managers on the economic, ecological and social present it and the role it can-have in the overall development framework to Improve the natural resources of the area.

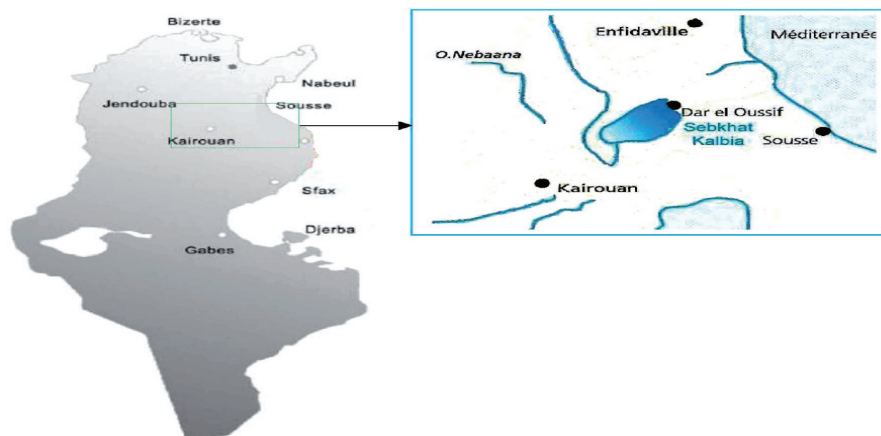


Fig.1. Localization map of the study area

3.1. Sample and Data Collection

*Spatial Analysis:* To make this work, we relied on several methods. A literature review proved necessary. An overview of the different papers and documents on the study areas. We completed this work by a bibliographic field work. Surveys were conducted to identify the social actors (users and local populations). The dynamics in the coastal zone and the spatial changes are approximated by a multi-day remote sensing study using aerial photographs and satellite images.

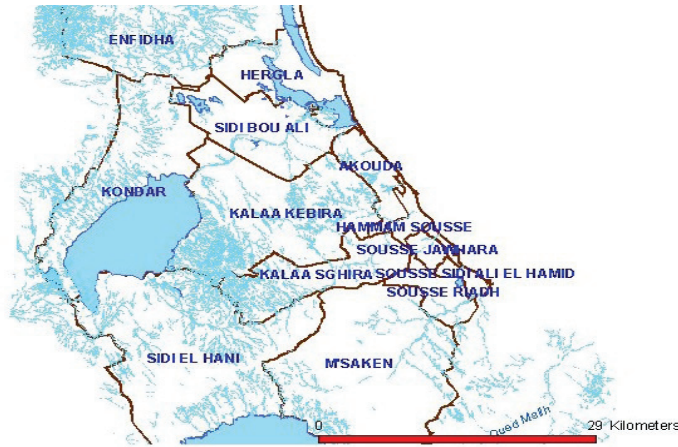


Fig.2. Map of hydrological Tunisian Sahel (agricultural Card, 2009)

*Environmental analysis*

The study of the evolution of the coastal environment requires a prior knowledge of the factors of the dynamic and morphological characteristics of the region as they are in nature. We successively examine the natural and environmental agents in action, intervention modalities of Man and retail molded the morphology of the Sahel region.

Table 1: meteorological data of the Sousse region (CRDA Sousse)

A.P	M.P	m.P	a.a.t	M	m	Q
327	727.5	112.1	18.6	31.4	6.9	45.6

A.P: annual precipitation M.P:maximum precipitation m.P: minimal precipitation  
 a.a.t: annual average temperature M: maximum temperature m: minimum temperature Q: index of Emberger

*Analysis of the “Centuriation”*

The study of archaeological card information, as well as work on a topographical map on a gross or aerial photography, have the particularity to place the researcher to the need to build an archaeological reasoning. Stratification images aims to define the different classes of land use and to highlight their composition. The image processing procedure is to perform a rendition of “first level” based on existing cartographic data and refine the product of the photo-interpretation through field trips. In this visit we identified the site at a place called Kraria. This site is at Lake El Sebkh at Kelbia, less than 800 m with a spreading surface of antique ceramics very important around visible archaeological structures (including some walls built with the technique of opus africanum surface with over a meter of height preserved in places. The walls and site structures are visible on Google Earth . It is a strategic location that controls the connection between Sebkh at El Kelbia and Sebkh at Halk El Menzal through Oued Essed. All these data lead us to propose, following a series of working hypotheses that take stock of the current state of knowledge. Finally, we will see how what we offer is always in relation to the genesis, formal design of landscapes and function of Centuries parcellaires and the dialéctique relationship between the different layers of the landscape (González Villaescusa, 1996). That is to say, so the diachronic evolution of landscape structures that have been implemented by the various companies that occupied the Sahelian soil.

3.2. Analyses and Results

Systematic cross field fragmented traces identified during the morphological analysis, were used to validate the existence of fragmented organizations some of which were previously only approached by archeomorphology. The multiplicity of the observations made on the aerial photos throughout the region will allow us to understand how it works in detail. Centuries networks frequently have studied a series of remblaiements whose origin is to be found in the water circulation characterized by a flow consists of particles eroded surface of surrounding soil. The ditches clogging layers are subject to a micro morphological sampling. Repetition of field observations and systematization of observations at different scales used to arrive at a typology of filling facies historical ditches. Secondly, the aim is to associate each type or each facies family origin, for the study of materials, the sedimentary processes and deposition mode and the synchronous or subsequent soil processes each deposit. These are highly dependent rhythms and sedimentation rates and seasonal variations or multi groundwater. These studies provide information on water flow dynamics, the average level of the water table during operation of the paleo-networks and after, on the state of the surrounding soil and plant landscape. The identification and definition of landscape units are important in air revelation piecemeal limits. The plains, basins and plateaus generally favor photo interpretation while hills and slopes are much less close. The vegetation, often developed on reliefs, Air gene detection. The development of land by moated networks is more intensive in low lying areas on the slopes and fragmented forms more numerous. When it is a well-recognized centuriation, it is legitimate to question its implementation on the ground or on a differentiated materialization. The empty areas can be surveyed using markers difficult to detect by photo interpretation (terminals hedges, field boundaries). The conservation and revelation of fossil traces can be explained by two interrelated criteria: the type of soil and sediment cover. It is frequently observed a balance between the areas of air revelation and certain types of soils mapped on soil maps. Thus, the shallow sandy loamy brown limestone soils appear to be good developers, while clay loamy brown soils tend to hydromorphe do not have the same qualities. The Kondar sector highlights the importance of soil criteria and the sediment dynamics downstream of the sebkh. Most axes northeast of El Kelbia are

now fossils and legible while those in the northwest are either lost to erosion due to poor natural drainage or were obliterated by sedimentary deposits more or less important and masking, which makes the delicate aerial observations. We note at the east and south of El Sebkhath Kelbia, the presence of Roman monuments and remains which are evident on aerial photographs. We can establish a special link between the Centurie network, the hydrological network, sediment dynamics and soil types. When we observe more carefully the Kondar area located northeast of sebkha, we see that the natural river system is highly developed. It irrigates and drains the area and serves as an outlet for Cadastral ditches dug further east and oriented sebkha (38G). This example shows the complementary and overlapping of natural and anthropogenic flows networks in this region.

*Centuries networks and hydrology*

The data available today in the Sahel region and around El sebkhat Kelbia allow us to consider a genuine mastery of hydraulics during Roman times. These studies in photo- and carto-interpretation resulted in a provisional model of operation of the network Centurie slopes of the sebkha. It highlights the role of decumani in cleaning up the plain. These areas correspond to major collectors draining runoff to El Kelbia. The diagram below highlights the complementarity between the network and the cadastral hydraugraphique network. A main function was proposed ditches around the sebkha studied: drainage runoff in the northwestern part draining meteoric water to the eastern part near the Roman ruins that existed in the region and ensuring the charging and the supply of water and maintaining the ecosystem and biodiversity in the region.

*Drainage and rainwater*

Given the nature of stormy autumn rains in the region, since ancient times, flood dimmable originate in river systems and flood depressions, rainy winter and spring are generally of secondary importance . Consequently, the water bodies in the area of Sebkhath undergo annual and inter-annual variation. During the last century the Sahel has experienced several times heavy flooding, the last recorded from September 1995 and September 1997 still show the frequency of this scourge in this region. That of the autumn of 1969 was the largest and most extensive since it covered the entire Sahel. All Sebkhath were completely filled with water, some of them borrowed natural outlets for pouring or to other Sebkhath either to depression areas or even to the sea.

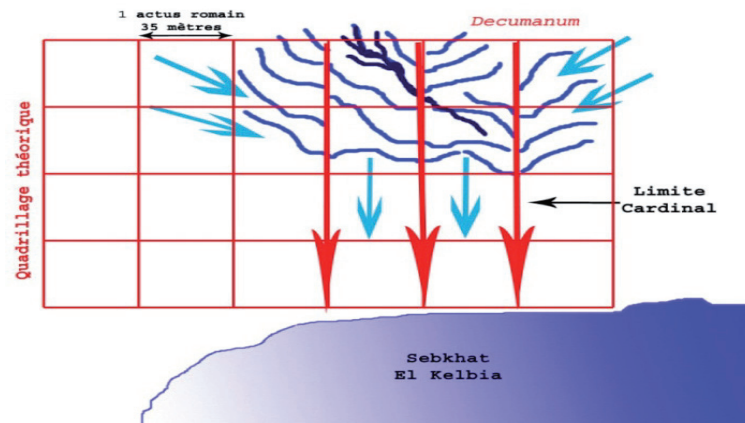


Fig.3. Diagram of complementarity between cadastral network and drainage system

This is the case of El Sebkat Kelbia which is connected through Wadi Essed to Sebkhath Halk El Menzel and it opens into the Mediterranean. The alluvial fans on the south side of the sebkha, covered by soil formations-bit advanced and connected to the network Centurie units are good natural drainage. The role of these networks of ditches is to evacuate the rainwater surplus during particularly heavy rains favored by the Mediterranean rainfall regime. On aerial photographs although several axes we notice the centuriée grid are erased and gone, this is most likely due primarily to strong erosion especially during periods of flooding and deposition of sediments in drainage ditches in the second time; discontinuing the development of the basic structure of the system would restore the area to its original state, as can be seen in the ancient drainage piecemeal, whose construction was abandoned (Chouquer and Favory, 1991). The results of this research show that the study area is a planned agrarian landscape that takes into account both technical concepts: first, the consolidation of a wet field, which resulted in the evacuation of the average water ditches; Then, defining a network of drains which constitute the intermediate structures of the agricultural area, creating cultivation areas delimited by the main ditches.

*Erosive Dynamics Analysis*

Dynamic map of the erosion shows two shares of water erosion:

- A share of abduction and transportation of materials by runoff; This action is manifested by an active gully and different degree of mass movements. Because of their topography and poor permeability, the most eroded areas are located on clayey levels around watershed Sebkhath El Kalbia. They are the site of many often intense slips and washouts. The low sloping lands are dominated by crops, these areas are also little affected by various forms of erosion and erosion processes become negligible and very localized.
- An accumulation share: the materials removed from the upstream areas are channeled through wadis (wadi Nebhana, Zroud and Margellil) and runoff and deposited in the lake of El Sebkhath Kalbia.

The concept of risk has become of common use in Francophone geographic studies in the late seventies. According Flageollet (1989) and Dauphine (2001), a natural risk is the probability of occurrence in given place at a given time, a potentially dangerous phenomenon which may cause damage to persons and property. Risk is a composite concept. It is the product of hazard and vulnerability. The hazard is the probability of occurrence of a phenomenon. The vulnerability reflects the fragility of a system. When the probability is coupled with the vulnerability allows a qualification of erosion risk (Dauphine, 2001). The risk we are interested in this research is that of erosion. This presents a threat and a danger to Sebkhath El Kalbia. The risk determination is based largely on the identification of events that leave traces more or less easily spotted on the ground or on the aerial photographs. These traces are phenomena corresponding to various processes. The mapping of areas at risk helps to know the phenomena that are occurring or they occurred in the past (Haboubi R., 2008). Thanks to this preventive mapping which is the result of duplication and interpretation of different maps, it becomes possible to prevent the risk of one hand and on the other to take action to avoid or reduce their effect. The aim of this type of card (fig.4) to inform about the potential dynamics of erosion. It also gives an idea about the areas that require priority interventions amenities include soil conservation.

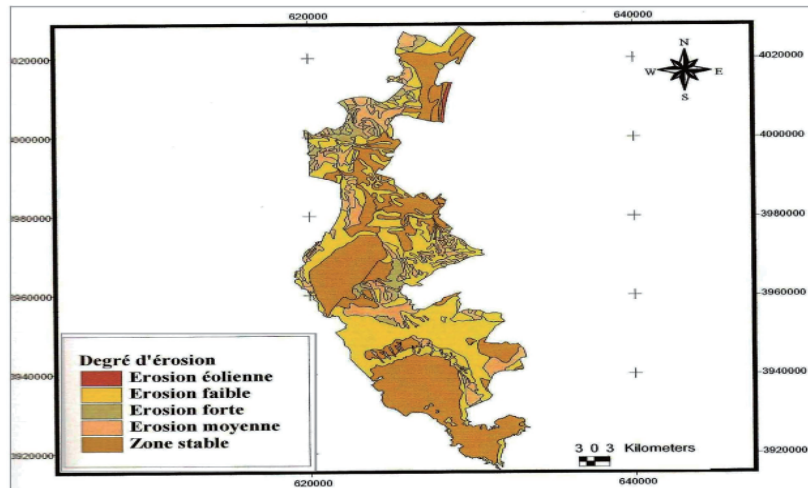


Fig.4. Modeling the map of the current dynamics of the Tunisian Sahel erosive

*Integrated local development adapted to Sebkhata El Kelbia*

The development project includes the lagoon as an ecological data that must be respected in order to preserve this ecosystem with its fauna and flora. The development of this site is part of a contemporary rallying natural configuration to a more modern design. The objective is to provide the region with a contemporary park while maintaining the site's natural environment. The park design offers multifunctionality of circuits composed of water and woodlands to ensure the attendance of up to visitors. The idea of development is largely inspired by nature, specifically the forest and all its vocabulary. Thus, we find in developed areas the same atmosphere as in a forest that is this succession of afforestation and clearings, light and shadow areas areas. Indeed, the species to plant will consist of vegetation of the area that can be easily adapted to local ecological conditions. With this development, the sebkha will be key to establish a development strategy for the entire area. Its position in the geometric center, near major urban municipalities is also the only place where that will challenge could be realized by a land development project both innovative qu'unificateur, which is part of a general approach sustainable development based on a pilot approach for the protection and enhancement of natural and cultural heritage.

*Landscape and local planning prototype*

The management plan and management of the nature reserve of El sebkhat Kelbia main objective the rehabilitation and preservation of various ecosystems while ensuring sustainable management of the site, in perfect harmony with a socio-economic development of the local population compatible with the conservation of nature. Also today the landscape is seen as a tool for sustainable development (Donadieu and Perigord, 2007).

To achieve these results the proposed development plan revolves around the following axes:

- Rehabilitation and ecosystem conservation;
- Installation of equipment and infrastructure;
- Promote socio-economic development activities;

An initial observation showed that some areas are degraded and require rebuilding their communities through reforestation and relined using as far as possible to natural species of the medium as *Tamaryx aphylla*, *A. halimus*, *Pistacia atlantica* introduction ... other species can be based on the results achieved in the arboretum El Hania. This will create a forest atmosphere ie a succession of woodlands and clearings, light and shadow areas areas. The creation of such plantations, provides a refuge for various nesting, migratory species and those of mammals in the region.

*Search model "design" of the sebkha*

As part of the landscape of the nature reserve El sebkhat Kelbia the design and appearance of different structures to be erected in the reserves should be inspired by local architecture and use local materials to integrate into the surrounding landscape. It is envisaged the installation of three entrances to the reserve and it is expected the following entries: On the east side near the forest Belloum the north side near the west side and Kondar to Bchchma. It provides for the construction of a second information center located at the east entrance of the forest of Belloum. These centers will provide the necessary information on the reserve for visitors. To carry out this function they have to be given the means and the necessary equipment (audio-visual, plans, charts). There are plans, too, the creation of observation points on boundary highlights that serve for taking views, movies and monitoring census operations of the reserve bird populations. Pending the setting of the control structure of the water level and when the registration remains dependent sebkha flood seasons, and to maintain a permanent damp environment, we envision the creation of a large artificial pond at point lowest extent. This basin that collects water will stay open all year. The creation of this artificial environment will ensure the continued existence of a biological diversity in this case birds and may thus contribute to the establishment of a permanent wetland. The area of this basin can be estimated at approximately 10 ha. As for the location in the field, he will be appointed in due course, after a verification of topographic environment. The creation of water points is essential, both for the supply basin to create inside the sebkha or for irrigation of forest plantations to create around the reserve. Thus, it provides for the creation of three-point equipment Water sides east, north and west. For public reception proposes the development of two rest areas and recreation 10 to 20 ha each one to the east entrance in the forest of Belloum, the other edge of the sebkha near the north entrance. These areas must be provided with the necessary equipment for playgrounds, sanitary facilities, refreshment etc. To monitor the work and the biological evolution of the reservation in question, rehabilitation and consolidation of the neighboring path network is needed of urgency. Knowing that adjacent land areas are inaccessible especially in rainy seasons.

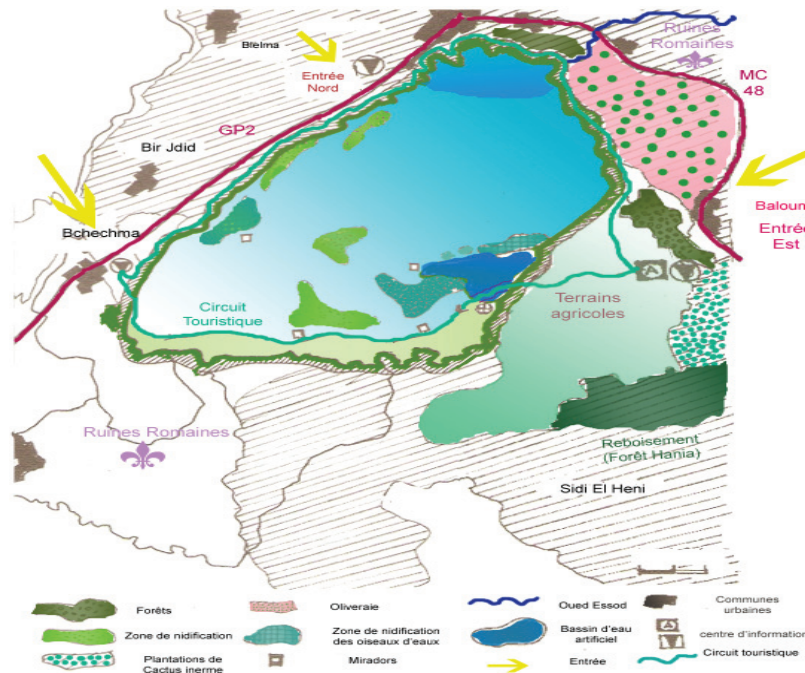


Fig.5. Development proposal on the east side sebkhah el Kelbia

*Benefits of landscape transformation: Use and neighborly*

The successful implementation of a development plan of natural areas is dependent on the participation of the local population in the implementation of various actions and measures advocated for the conservation and recovery of these spaces. Membership of the population is even more important if it was consulted and participated in the development of the various phases of the development plan. To improve the socio-economic conditions of the communities using the natural reserve of El Sebkhah Kelbia, we are inspired by Wunder (2000) on the economic incentive role of ecotourism. The figure shows an example of the possible links between the local tourism development (ie with the participation of the local population) and the conservation of natural resources and biodiversity. This virtuous cycle based on the idea that the creation and distribution of income through ecotourism activity induces, promotes or accelerates local social and institutional changes. In the environmental field they translate into changes in patterns of use, exploitation and management of ecosystems and their particular components. These changes can take different forms. First orientation of production (agriculture, grazing, breeding) towards greater sustainability. Then a transformation of local economic systems by choosing new activities coming to take the place of certain production methods not favorable to environmental sustainability. Finally strengthening and institutional innovations to promoting sustainable use of natural resources. These changes allow term improvement of the status and the state of resources and biodiversity. Tourism development is in turn encouraged by the improvement in the environmental quality of services offered to visitors. Contact and consultation with the communities using them have led us to make proposals if mentioned below to guarantee their participation and increase motivation to achieve conservation and development goals agreed in the management plan.

**4. Conclusion**

The sebkhah El Kelbia, interface between the marine and continental environments, plays an important role in global coastal fringes. These areas are involved in ecological processes, energy and basic economic to operate and maintain the water balance of the lagoon ecosystem. This complex is the ultimate site of the Mediterranean region, its biological and ecological values lie in its role as a migration staging vital for water birds crossing the Mediterranean. This site also has an undeniable socio-cultural interest and is a source of life for the local population. Because of these values, the wetland El Kelbia was identified as a site of biological and ecological interest.

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## OFP-021

## Recycling of Rubber Waste in Roller Compacted Concrete

Abdelaziz Meddah<sup>a</sup>, Miloud Beddar<sup>a</sup>, Abderrahim Bali<sup>b</sup>, Hamza Bencaci<sup>a</sup><sup>a</sup>LMMS Laboratory, Mohamed Boudiaf University-M'sila, B.P 166 Echbilia 28000, M'sila, Algeria<sup>b</sup>URIE, Ecole Nationale Polytechnique d'Alger, B.P 182 El-Harrach, Alger, Algeria**Abstract**

This study aims to analyze the possibility of using of rubber particles in roller compacted concrete (RCC) mixes as aggregates. These particles were added to the mix by the partial replacement of the total volume of gravels. The results show that the inclusion of rubber in RCC mixes changes their characteristics as well as fresh as the hardened state. Although the mechanical properties decrease when the rubber content in the mix increases, it should be noted that it is possible to valorize the rubber in roads with low traffic. In the other hand, the rubber particles may improve certain desired properties such as; ductility and resistance to cracking.

**1. Introduction**

The development of industrial activities envisaged in nowadays is accompanied by enormous environmental problems, as the different stages of manufacture of a product generate by-products and various waste. This has led scientists to search technical solutions and practical applications to absorb a part of these wastes. The rubber tires are considered as one of the major waste problems for all countries due to their direct effect on the environment and the human health; contaminating soils, water and air. The rubber tire wastes are not bio-degradable and can form a favourable environment for breeding rats, mice, vermin and mosquitoes (Meddah, Beddar, & Bali, 2014; Naik & Singh, 1991; Siddique & Naik, 2004).

Recycling of rubber waste in civil engineering areas is an important challenge which could ensure multidisciplinary benefits to researchers, engineers and also to decision markers. Economically, the use of rubber aggregates in concrete reduces the cost of the final product and also creates additional sources to meet the growing needs of these materials in roads and buildings sectors. From an environmental perspective, the recycling of rubber waste can contribute to the protection of the environment and natural resources. Technically, the inclusion of rubber particles gives to the concrete a greater ability to deform before failure and even prevents the development of cracks (Meddah, 2015). Roller compacted concrete (RCC) used in pavements has the same basic ingredients as conventional concrete: cement, water, and aggregates. But unlike ordinary concrete, it is a drier mix-stiff enough to be compacted by vibratory rollers. Therefore, the fundamental characteristic of RCCP is its dry appearance, which requires the application of compaction efforts to consolidate the mix (Debieb, Courard, Kenai, & Degeimbre, 2009; Gauthier & Marchand, 2001; Marchand, Gagne, Ouellet, & Lepage, 1997; Nanni & Meamarian, 1993; Pouliot, 2001; Tremblay, 1997) density, and compressive strength of laboratory-prepared roller-compacted concrete (RCC). Several studies on the effect of the incorporation of rubber waste as aggregates on concrete performance have been reported in the literature. The studies carried out on the rubberized concrete show a reduction in unit weight and mechanical properties (compressive, tensile and flexural strengths) as well as a more ductile behavior according to the increase in rubber content (Khaloo et al., 2008; Bravo and de Brito, 2012). The largest part of these studies was conducted on ordinary concretes and their results have not been projected on RCC mixes. The aim of the present work is the study, of the possibility of using rubber tire wastes in RCC. The rubber particles are used as aggregates in concrete as partial substitution by volume of crushed calcareous gravels at rates varying from 0, 5, 10, 15, 20, 25 and 30%. Fresh and hard properties are evaluated and compared between them according to the rubber content in the mix. Theoretical models are proposed to predict of mechanical response of rubberized RCC according to the rubber content in the mix.

**2. Materials**

Three fractions of crushed limestone gravel were used of maximum sizes of 8, 15 and 20 mm and with density of 2595, 2622, 2604 kg/m<sup>3</sup>, respectively. Portland cement CEM II/A42.5 from Ain El-Kebira Factory in Algeria was used throughout this study, with a density of 3150 kg/m<sup>3</sup>. Natural sand of 5 mm maximum size and 2640 kg/m<sup>3</sup> of density was used for all mixes. The grain size distributions of aggregates used are shown in Figure 1. The rubber particles of 1253 kg/m<sup>3</sup> of density were provided by SAEL factory in Algiers. The shredded rubber aspect is shown in Figure 2.

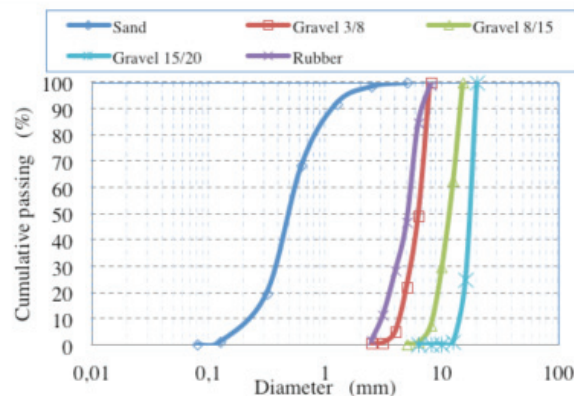




Fig. 2. Rubber aggregates used.

### 3. Experimental procedures

The aggregate ratios were chosen to obtain a combined grading size distribution curve between limits recommended by the US Army of Engineers (Meddah et al., 2014). Cement and water contents were chosen using soil mechanics procedure according to ASTM D1557 standard (Marchand et al., 1997). The specimens were demoulded after 24 h of their preparation and were conserved in laboratory conditions (25°C and 50-60 RH). VeBe time and density of fresh concrete were measured for each rubber contents according to ASTM C1170 standards. Compressive, bending and splitting tensile strengths were evaluated at age of 28 d according to ASTM C39, ASTM C78 and ASTM C496. Static modulus of elasticity was determined at 28 d, according to the standard ASTM C469. Cylinder and cube specimens; (160x320 mm) and (100x100x100 mm), were used for compressive strength measure. Prismatic specimens (100x100x400 mm) were used for bending strength, whereas, for splitting tensile strength, cylinder specimens were used (160x320 mm).

### 4. Results and discussion

#### 4.1. Effect of rubber content on fresh RCC properties

Since RCC is a stiff concrete, its workability is commonly measured with VeBe test. Vibrating compaction time was measured for each rubber contents. The relationship between the vibrating compaction time and rubber content is shown in Figure 3. It clearly appears that the addition of rubber particles to RCC mixes improved their consistency and there was a tendency to decrease inversely in VeBe time as the rubber content increased. The VeBe time changed from 33s for the control mix to 23 s for the mix with 30% of rubber. Therefore, the decrease in vibrating compaction time might be explained by the fact that the rubber particles were less water absorbent compared to mineral aggregates. In presence of rubber aggregates in the mix, the free water increased and consequently the compaction process became easier. It should be noted that regular decrease in density was observed with the rubber content increase in the mix. The unit weight decreased from 2,433 kg/m<sup>3</sup> to 2,292 kg/m<sup>3</sup> when rubber was incorporated at 30% of replacement. As shown in Figure 3, the maximum loss of 5.8% in unit weight was observed for the mix containing 30% of rubber. This reduction might be due to the low unit weight of rubber compared to the substituted natural aggregates.

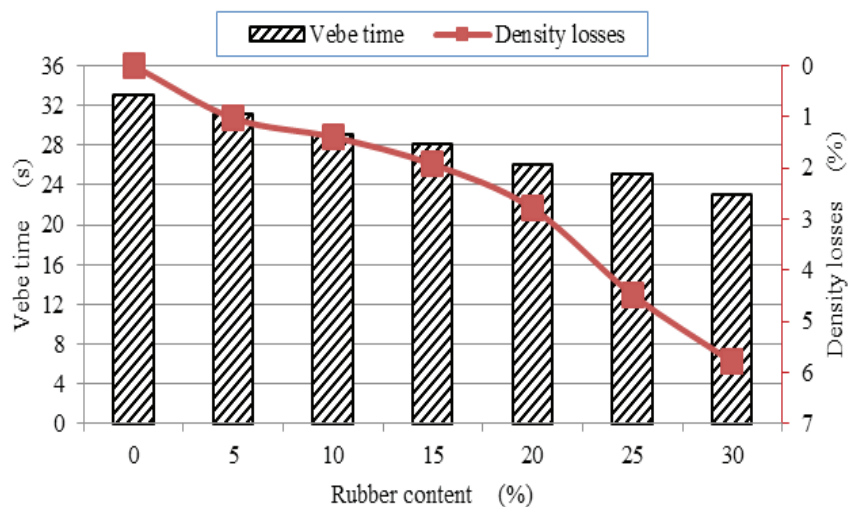


Fig. 3. Effect of Rubber on fresh RCC properties.



4.2. Effect of rubber content on hardened concrete properties

The results of mechanical properties obtained on mixes with different rubber contents are presented in Table 1. It clearly can be noted that the increase in rubber content affected negatively the strength and elasticity modulus values. The variation of the strength loss ratios according to the rubber content in the mix is presented in Figure 4. It can be seen that the compressive strength was highly sensitive to the increase in rubber content in comparison with the flexural and splitting tensile strengths. These results are in agreement with previous investigations conducted on ordinary concrete with rubber additions (Eldin and Senouci, 1993; Al-Tayeb et al., 2013). The authors have indicated in their studies that the mechanical properties of concrete decreased with increasing rubber content in the mix. Several other authors have reported, in the literature, that the low adhesion between rubber particles and the cement past was responsible for these losses (Raghavan et al., 1988; Segree and Joekes, 2000). Other researchers (Eldin NN & Senouci, 1994; HO anh, 2010; Meddah, 2015) have attributed that the loss of strength of rubberized concrete was due to the to the significantly lower stiffness of rubber compared to that of natural aggregate, on one hand, and to the stress concentrations in the cement paste around the rubber particles, in the other hand. Figure 5 shows how the poor adhesion leads to the creation of low-resistance areas, the failure starts with disintegration of rubber particles from the cement matrix, which leads to accumulations of stresses in adjacent areas.

Table 1. Strengths and elasticity modulus.

Rubber content %	28d Strength MPa				Elasticity modulus GPa
	Compressive strength		Splitting tensile strength	Flexural strength	
	Cylinder	Cube			
0	27.12	30.1	2.79	5.82	33.89
5	25.69	27.0	2.76	4.42	31.61
10	21.2	26.65	2.47	5.3	25.77
15	19.04	23.36	2.24	4.7	21.67
20	17.42	22.51	2.17	4.49	20.86
25	15.3	22.46	2.15	4.25	18.21
30	13.58	20.46	2.13	4.0	16.26

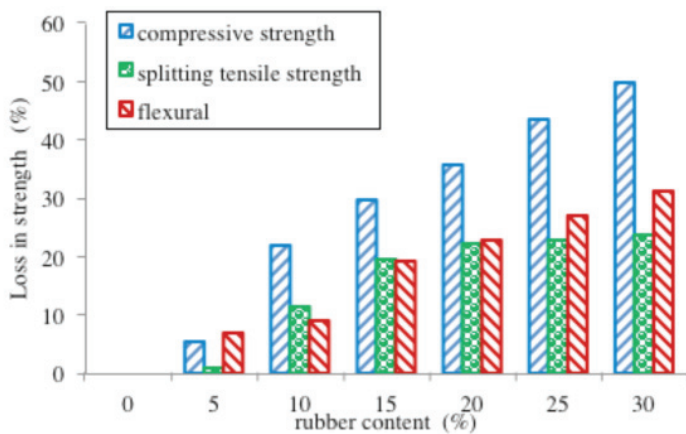


Fig. 4. Strengths losses versus rubber contents



Fig. 5. Interfacial-failure between rubber and cement past.

In order to predict strength values of RCC according to the rubber content in the mix, theoretical models are proposed in this work (Table 2). These models permitted to deduct the strength values from the controlmix strengths (without rubber), which the strength could be calculated simply by introducing the rubber rates to be used in the equation. For more understand about the effect of the introduction of rubber in the behavior of RCC, the proposed models were compared with experimental results, in one hand, and with previous models reported by Khatib & Bayomy, 1999, in the other hand. The obtained results are shown in Figure 6-8. It can be seen that the proposed models in this study describe satisfactory the behavior of rubberized RCC with relative changes less than 2%. It should be noted also that the models of Khatib & Bayomy, 1999 which described the mechanical properties of rubberized ordinary concrete cannot predicting of strength of rubberized RCC. From these Figures, it can be noted also that the RCC mixes were less sensible to incorporating rubber as ordinary concretes. This conclusion might be due to the intensive compaction of RCC, which reduced the voids and enhanced the adhesion between rubber particles and the cement past.

Table 2. Predicting strength models

Strength	Model
Compressive	$f_{c28} = f_{c28}^* [0.1 + 0.9(1 - R)^{2.3}]$
Splitting tensile	$f_{t28} = f_{t28}^* [0.1 + 0.9(1 - R)^{1.2}]$
Flexural	$f_{f28} = f_{f28}^* [0.18 + 0.82(1 - R)^{1.2}]$

R: rubber content,  $f^*$ : strength of control mix (without rubber)

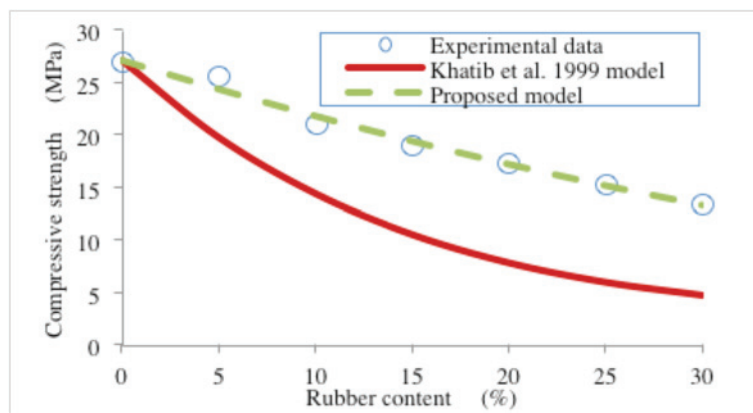


Fig. 6. Compressive strength versus rubber content.

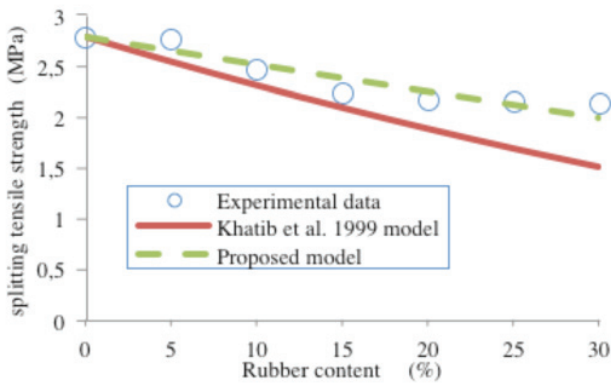


Fig. 7. Tensile strength versus rubber content

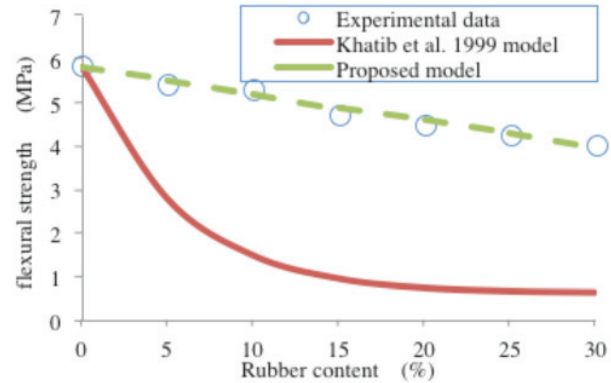


Fig. 8. Flexural strength versus rubber content

4.3. Effect of rubber on cracking resistance potential

Figure 9 shows the specimen failure type under flexural load. It appeared that the specimens were broken into two pieces with mixes containing rubber at rates less than 5%. For the other mixes, with high rubber content, it was shown that the two parts of specimens were not separated and the cracks were inversely proportional to the percentage of rubber added. Therefore, the use of rubber particles in RCC, gave to specimens more absorption energy capacity and the failure became more ductile. These results are in agreement with those observed by Raghavan, Huynh, & Ferraris, 1988 when conducting a study on mortar specimens with rubber shreds. He reported that these specimens were able to support additional effort at failure. The results presented in our study indicate that the incorporation of rubber in RCC mixes improves their ductility and consequently their cracking resistance potential.

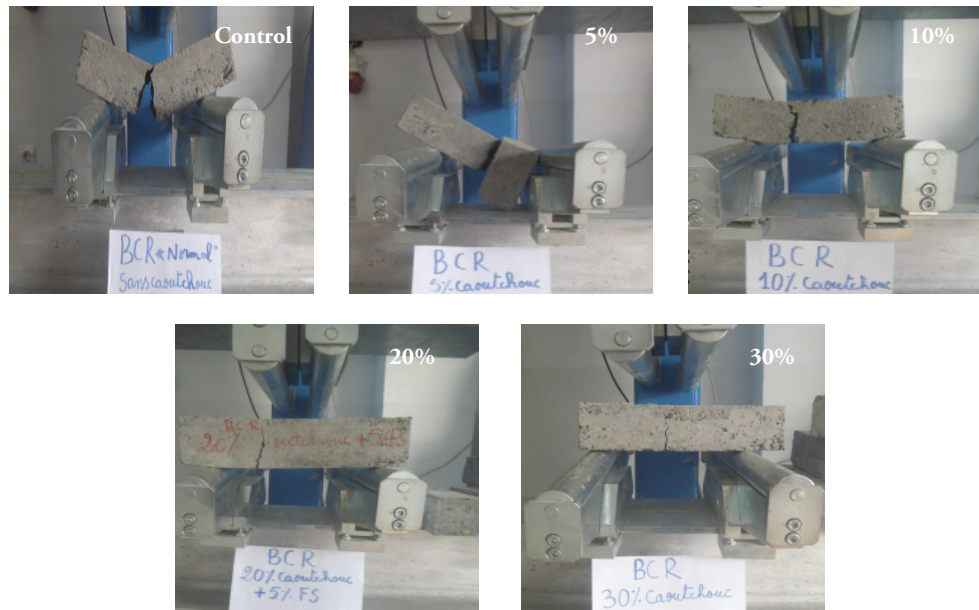


Fig. 9. Effect of rubber on RCC-failure type.

## 5. Conclusion

The effect of recycling rubber wastes in RCC mixes was investigated in this work. The results obtained showed that the RCC mixes are less sensitive to incorporating rubber as ordinary concrete. It was obtained that density and the mechanical characteristics of RCC are affected by the rate of rubber in the mix. Despite the reduction in strengths of RCC caused by incorporated rubber particles, their use remains possible in pavements because the technical requirements are not always the same. On the other hand, the addition of rubber particles to RCC may be beneficial due to the improvement of some properties such as high ductility, low porosity, more workability and also low unit weight. Recycling and valorizing shredded rubber in pavements may help producing an ecofriendly material and eliminating some quantities of wastes. The rubberized RCC can be used for some projects such as; low traffic pavements, rural roads and large areas of pedestrians.

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## OFP-022

**Investigation of Residual Stress in Brake Pads**Fatih Uzun<sup>a</sup>, Ali Nezih Bilge<sup>b</sup><sup>a</sup>*Yeditepe University, Atasehir, Istanbul, 34520, Turkey*<sup>b</sup>*Bilgi University, Santralistanbul, Istanbul, 34060, Turkey***Abstract**

Vehicles have safety systems for breaking that transform mechanical energy into heat. During the operation, rapid heating and cooling cycles cause residual stress remaining in brake pads. Residual stresses lead the formation of cracks and affect performance and lifetime of these safety parts of vehicles. In this study, longitudinal ultrasonic waves are used to determine residual stress in brake pads. For this purpose, a correlation between ultrasonic wave velocity and stress in brake pads is developed. Ultrasonic wave velocities in various service life ended brake pads are measured using immersion ultrasonic technique. The correlation is used to determine residual stress related to operation period in these brake pads. A final correlation between residual stress and operation period is developed to predict residual stress.

**1. Introduction**

Energy cycle of an automobile starts with addition of fuel which brings a potential energy. After the engine started potential energy in the fuel is converted into heat energy and heat energy is converted to kinetic energy. Air friction and friction on tires convert kinetic energy to heat energy. If the automobile is needed to stop, brake system takes place and converts kinetic energy into heat energy. Heat energy produced during breaking cannot be stored again and it is released into air. At that point energy cycle of the automobile is completed.

Brake systems are very important safety components of automobiles. During the energy cycle an automobile can be stopped by friction of air and tires by converting kinetic energy into heat energy. However, in order to control the speed of the automobile, mechanical systems are required to speed up energy conversion. Brake systems in automobiles convert energy of motion into heat energy by applying an opposing force.

An efficient braking system should stop a vehicle within seconds. Opposite force that accomplishes rapid deceleration is friction force. Brake systems are composed of pads and rotor. Pads are pressed on moving rotor to apply friction force. Harder the pressure applied by the pads higher the friction force applied in opposite direction of the momentum.

During the contact of pads and rotor kinetic energy is converted into heat and most of that heat is stored in pads and rotor parts of brake system. As a result of the heat input, temperatures of these parts rapidly increase to high values. On the other hand, atmospheric temperature is very little when compared to temperature occurred in brake parts and heats in these parts are rapidly transferred to air. This cycle is repeated many times during the operation of a vehicle and brake parts. Rapid heating and cooling periods has harmful effects on materials.

Thermal analysis of brake system parts is performed by many researchers. Qi focused on disc/pad interface temperature using thermocouple method with an exposed hot junction configuration and the magnitude and distribution of the interface temperature were investigated (Qi and Day, 2007). As a result of this study it is stated that decreasing contact area does not linearly increase the maximum temperature at the friction interface. Lee is performed a numerical simulation and analyzed transient thermo elastic behaviors in disk brakes. The finite element model simulated the repeated brake condition to investigate thermo elastic behavior of disc brake (Choi and Lee, 2004). Another numerical model by Belhocine models the temperature distribution in the disc brake according to parameters such as the type of braking, the geometrical design of the disc and the used material (Belhocine and Bouchetara, 2012). Adamowicz developed a three dimensional finite element model under non-axisymmetric thermal load and analysis of the disc rotor was performed without the existence of pad (Adamowicz and Grzes, 2011). Brake disc surface temperature and emissivity was measured by Siroux experimentally. In that study, measurement was performed using a fiber optic two-color pyrometer and dependence of emissivity on the surface oxidation was proposed (Thevenet et al, 2010). Collin developed a simplified simulation for the thermal analysis of simple shaped moving parts using analytical methods (Colin et al, 1988). There are different factors that affect surface temperature. These factors were analyzed using a simplified method and most significant ones were determined (Long and Petterson, 1974). The influence of brake pads thermal conductivity was researched experimentally by Milenkovic (Milenković et al, 2010).

Formation of stress and remaining residual stresses are investigated by various researchers. Zhang developed a finite element model of brake discs of high speed trains. 3-D transient temperature field and stress fields of brake discs for the breaking process were simulated (Zhang et al, 2009). Ripley and Kirstein analyzed residual stresses in a cast iron brake disc rotor. Neutron diffraction which is a non-destructive technique was used in order to determine residual stresses on a service life ended brake disc (Ripley and Kirstein, 2006). D'Errico performed failure analysis for motorcycle brake disc. In order to test the resistance to tempering, residual stress field was investigated using X-ray diffractometric analysis on the disc brake surface (Boniardi et al, 2006). Mackin analyzed formation of thermal cracks in disc brakes related to thermal stresses (Mackin et al, 2002). Thermal stress analysis for railway disc brake system was performed with finite element method by Seok (Kim et al, 2008).

Residual stress measurements through the thickness of the material are defined as bulk residual stress measurement. These measurements bring thickness averaged stress state of the material. Bulk residual stress measurements performed using neutron diffraction technique and ultrasonic technique. Both of them are non-destructive techniques. Different studies on welded steel samples show that residual stress distributions in studies performed with these methods are similar. Residual stress never reaches to zero or negative compressive stress state in welded samples. D. Bruno and B. D. Dunn

investigated residual stress in two curved plates cut from a large welded propellant tank for spacecraft. Measurements are performed by neutron and x-ray diffraction. Thickness averaged residual stress determined by neutron diffraction technique (Bruno and Dunn, 2004). In previous studies, F. Uzun and A. N. Bilge investigated bulk residual stress distribution in multi pass welded steel plates which are provided by British Energy. In their work two different methods of ultrasonic technique were used. In one of these studies contact ultrasonic technique is used to show 2-D residual stress distribution throughout the plate (Uzun and Bilge, 2011). Another study by F. Uzun and A. N. Bilge was performed for different multi pass welded steel plate (Uzun and Bilge, 2011). Scott determined residual stress in extruded billets by using longitudinal acoustic waves (Scott et al, 1979). Sanderson used laser generated ultrasound to measure residual stress (Sanderson and Shen, 2010). Variations in the ultrasound velocity were related to the residual stress state. Doxbeck used laser generated creeping longitudinal waves to determine residual stresses (Doxbeck et al, 2000).

Brake systems are the most important safety parts of vehicles. Failures in these parts can result with catastrophic accidents. In order to deal with problems in brake systems many studies are performed by different researcher. These studies mostly deal with material composition of friction parts, thermal analysis and stress analysis. Stress analyses are mostly performed by numerical simulations. Studies deal with friction pad and rotor parts of brake systems. In this study residual stress in brake pad backing plate is investigated. Brake pads operated for various distances are provided by Renault MAIS Turkey. Residual stresses occurred according to operation period is investigated. Measurements are performed using previously accepted immersion ultrasonic technique.

## 2. Methodology

Effect of stress on wave propagation is investigated by D. S. Hughes, and J. L. Kelly, in their study, "Second-Order Elastic Deformation of Solids", in 1953 (Hughes and Kelly, 1953) using Murnaghan's (Murnaghan, 1937) theory of finite deformations and third-order terms for energy. They have determined the velocities of longitudinal and shear waves as a function of applied stress by subjecting the material to hydrostatic pressure which is defined as compression. The speed of waves propagating in the direction 1 and having particle displacements in the 1, 2 and 3 directions in an initially isotropic body subjected to a homogeneous triaxial strain field are given by Equation 1 which are illustrated in Figure 1.

$$\rho_0 V_{11}^2 = \lambda + 2\mu + (2l + \lambda)\theta + (4m + 4\lambda + 10\mu)\alpha_1 \quad (1.a)$$

$$\rho_0 V_{12}^2 = \mu + (\lambda + m)\theta + 4\mu\alpha_1 + 2\mu\alpha_2 - \frac{1}{2}n\alpha_3 \quad (1.b)$$

$$\rho_0 V_{13}^2 = \mu + (\lambda + m)\theta + 4\mu\alpha_1 + 2\mu\alpha_3 - \frac{1}{2}n\alpha_2 \quad (1.c)$$

where,  $\rho_0$  is initial density,  $v_{11}, v_{12}, v_{13}$  are speed of waves propagating in the 1 direction with particle displacements in the 1, 2, 3 directions respectively,  $\lambda, \mu$  are Lamé or second-order elastic constant,  $l, m, n$  are Murnaghan's third-order elastic constant,  $\alpha_1, \alpha_2, \alpha_3$  are components of the homogeneous triaxial principal strains in the 1,2,3 directions and  $\theta$  is  $\alpha_1 + \alpha_2 + \alpha_3$ . For a state of uniaxial stress, there are five unique wave speeds which may be determined from Equations 2. First consider the stress acting in the 1 direction. The strains are  $\alpha_1 = \epsilon$  and  $\alpha_2 = \alpha_3 = -\nu\epsilon$  where  $\nu$  is Poisson's ratio. Equation 1 (Egle and Bray, 1976) reduce to Equation 2, given below.

$$\rho_0 V_{11}^2 = \lambda + 2\mu + [4(\lambda + 2\mu) + 2(\mu + 2m) + \nu\mu(1 + 2l/\lambda)]\epsilon \quad (2.a)$$

$$\rho_0 V_{12}^2 = \rho_0 V_{13}^2 = \mu + [4\mu + \nu(n/2) + m(1 - 2\nu)]\epsilon \quad (2.b)$$

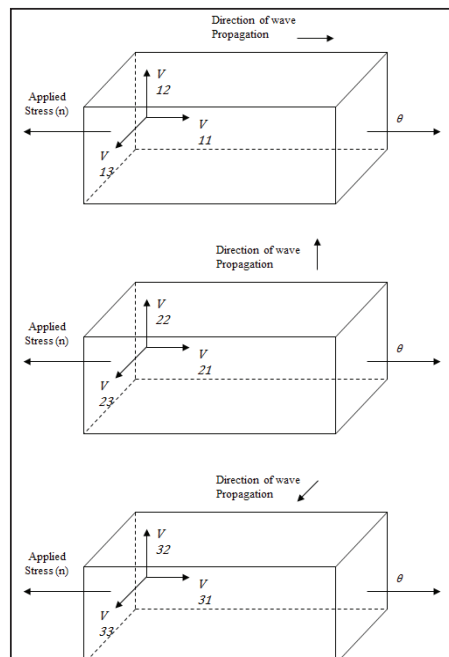


Fig. 1. Velocity of plane waves and stress field on orthogonal coordinate system (Bray and Stanley, 1996)

The speeds of plane waves travelling perpendicular to the uniaxial stress may also be determined from Equation 3.

$$\rho_0 V_{22}^2 = \lambda + 2\mu + [2l(1 - 2\nu) - 4\nu(m + \lambda + 2\mu)]\epsilon \quad (3.a)$$

$$\rho_0 V_{21}^2 = \rho_0 V_{31}^2 = \mu + [(m + \lambda + 2\mu)(1 - 2\nu) - \nu m/2]\epsilon \quad (3.b)$$

$$\rho_0 V_{23}^2 = \rho_0 V_{32}^2 = \mu + [(m + \lambda)(1 - 2\nu) - 6\nu\mu - n/2]\epsilon \quad (3.c)$$

The relative changes in wave speed with axial strain may be calculated from Equations 2 and 3 if it is assumed that the relative changes are small. The resulting equation for longitudinal waves that propagate and oscillate in the same direction is defined with the equation given below.

$$\frac{\partial V_{22}/V_{22}^0}{\partial \epsilon} = -2\nu \left( 1 + \frac{m - \mu l/\lambda}{\lambda + 2\mu} \right) = L_{22} \quad (4)$$

In Equation 4,  $L_{ij}$  is the acoustoelastic constant and the superscript 0 indicates the wave speed at zero axial strain. The third order constants  $l, m, n$  may be evaluated in terms of the relative changes in wave speeds as given below.

$$l = \frac{\lambda}{1 - 2\nu} \left[ \frac{1 - \nu}{\nu} \frac{\partial V_{22}/V_{22}^0}{\partial \epsilon} + \frac{2}{1 + \nu} \left( \frac{\partial V_{21}/V_{21}^0}{\partial \epsilon} + \nu \frac{\partial V_{23}/V_{23}^0}{\partial \epsilon} \right) + 2\nu \right] \quad (5.a)$$

$$m = 2(\lambda + \mu) \left( \frac{\nu}{1 + \nu} \frac{\partial V_{23}/V_{23}^0}{\partial \epsilon} + \frac{1}{1 + \nu} \frac{\partial V_{21}/V_{21}^0}{\partial \epsilon} + 2\nu - 1 \right) \quad (5.b)$$

$$n = \frac{4\mu}{1 + \nu} \left( \frac{\partial V_{21}/V_{21}^0}{\partial \epsilon} - \frac{\partial V_{23}/V_{23}^0}{\partial \epsilon} - 1 - \nu \right) \quad (5.c)$$

In the case of longitudinal waves that propagate and oscillate in the same direction, relation between ultrasonic wave velocity and stress can be defined with Equation 6 where  $\partial \sigma$  is stress change from a reference level,  $L_{22}$  is acoustoelastic constant ( $L_{ij}$ ),  $V_{22}$  is longitudinal wave velocity, and  $V_{22}^0$  is longitudinal wave velocity at axial zero stress.

$$\frac{\partial V_{22}/V_{22}^0}{\partial \sigma} = L_{22} \quad (6)$$

Thermal stresses are formed as a result of thermal processes, such as welding. These thermal processes cause non-uniform temperature changes in material. Associated with local heating, expansion and contraction occur around the heated zone of the material. However, if the expansion zone is surrounded by the material that is not been heated or less heated, this part prevents material to expand or contract freely and residual stresses are formed. The basic relation that expresses thermal stress is given in Equation 7. Finally, relation between ultrasonic wave velocity and total of longitudinal and transversal residual stresses is determined as:

$$\sigma = E \alpha_L \Delta T \quad (7)$$

where  $\sigma$  is the thermal stress,  $E$  is the modulus of elasticity,  $\alpha_L$  is thermal expansion coefficient, and  $\Delta T$  is temperature change. By observing the relation between thermal stresses and ultrasonic wave velocity, it is possible to determine thermal residual stresses in materials.

Acoustoelastic constant is determined by using linear equation for ultrasonic wave velocity variations. Modulus of elasticity and thermal expansion coefficient for steel backing plate are 193 GPa and  $15.9 \text{ }^\circ\text{C}^{-1}$ , respectively. Slope of the plot of velocity variations vs. thermal stress defined the thermally determined acoustoelastic constant as shown in Figure 2. Thermally determined acoustoelastic constant for steel backing plate is  $-0.00019625 \text{ Mpa}^{-1}$ .

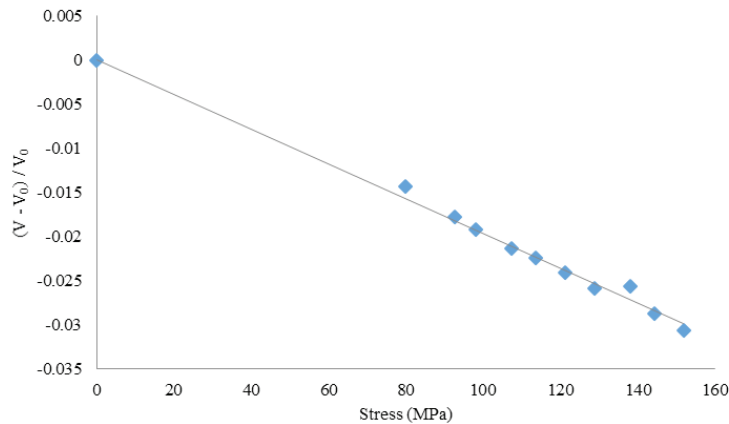


Fig. 2. Steel backing plate stress to velocity change

Experiments are performed at Yeditepe University Non Destructive Testing laboratories. Brake pads with model number of 7701208122 are provided by Renault MAIS Turkey. Nine brake pads of the same product are used. One new unused and eight used brake pads are provided. All these pads were used for different operation periods. Operation periods are determined in terms of distance travelled with the brake pad. Ultrasonic wave velocity results obtained from the unused pad are used as no stress state velocity values for residual stress calculations.

Ultrasonic immersion technique is used with precise thickness measurement system. Ultrasonic waves produce echoes from surface and back wall of the material. Computer integrated system measured time differences between these two echoes. If the thickness of the material is known, wave velocity in the material can be calculated. During this work thickness of the material is accepted to be constant. Water bath is mounted on a mechanism that provides movement on two axes. This computer integrated system allows measurement of wave velocity throughout the material surface. Experimental setup is shown in Figure 3.

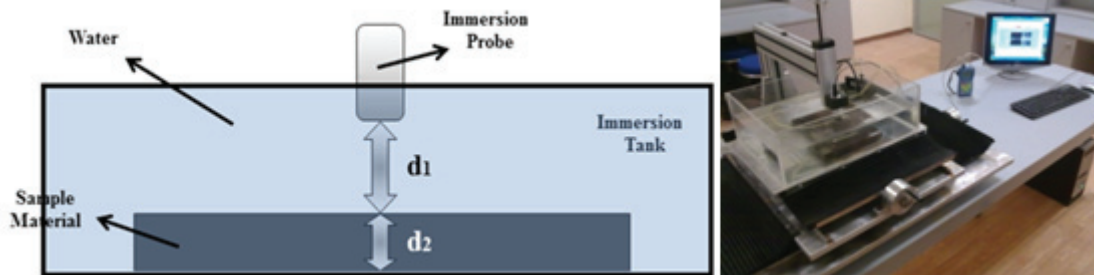


Fig. 3. Schematic diagram and picture of the immersion system

### 3. Results

Ultrasonic wave velocity measurements are performed on 6 points at each of the brake pad. Measurement points are illustrated in Figure 4. However, wave velocity at the connection part of the brake pads deviated too much as a result of difference in thickness at that point. So that, measurement data is reduced to five points in the central zone of brake pads. Average of each measurement set is used to calculate residual stress for the brake pad. Center of the brake pad is selected for measurement because at that part of brake pads backing plate thickness is homogeneous. Finally, an average residual stress value for each brake pad is calculated.

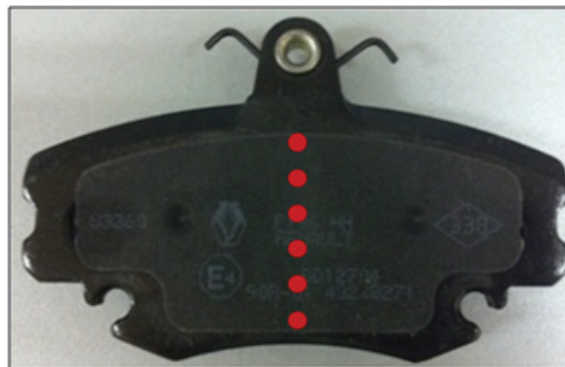


Fig. 4. Illustration of brake pad and wave velocity measurement points

Results of the measurements in each brake pad are analyzed in terms of standard deviation and averages are calculated. Maximum deviation is 18.39 m/s at the first brake pad while minimum deviation is 2.59 in the second brake pad. Deviations are less than 0.3 % of average ultrasonic wave velocity values. Low deviation in results show that average values are reliable.

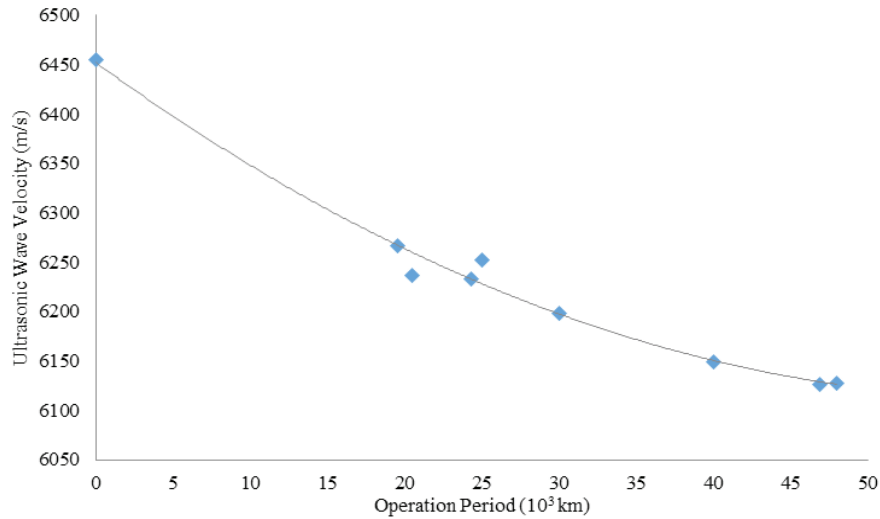


Fig. 5. Ultrasonic wave velocity related to operation period

Ultrasonic wave velocity distribution is illustrated in Figure 5. A parabolic distribution of wave velocity is obtained. Wave velocity decreases with increasing operation period. R-square value states that experimental results fit to the parabolic equation with more 98.5 % accuracy.

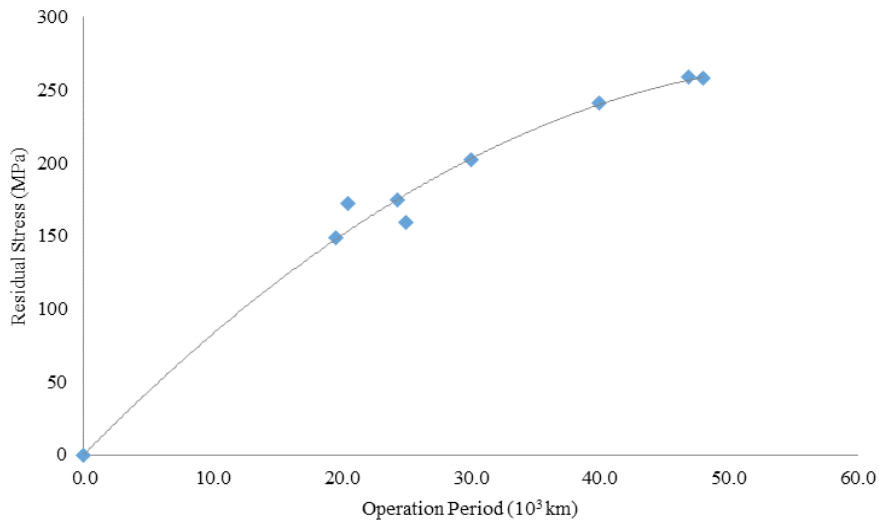


Fig. 6. Residual stress related to operation period

Ultrasonic wave is propagated normal to the stresses in x and z axes. These are the stresses parallel to surface of the material. Residual stresses in the backing plate of each brake pad are calculated according to the relation between thermal stress and ultrasonic wave velocity. Calculated residual stress values are bulk residual stresses which are the sum of the stresses in x and z directions. Residual stress distribution is illustrated in Figure 6. Distribution of residual stress is parabolic. It can be stated that at longer operation periods, residual stress shift is expected to be decreased.



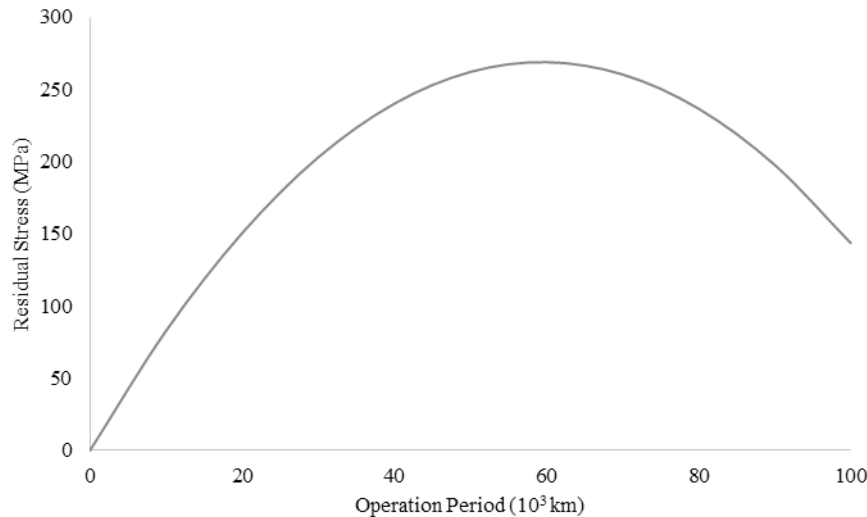


Fig. 7. Predicted residual stress related to operation period

Equation of the parabolic distribution of residual stress is given in Equation 8. In this equation  $\sigma$  represents bulk residual stress in brake pad,  $x$  represents distance travelled by the vehicle and  $a$  and  $b$  are constants. For this series of brake pad  $a$  is  $-0.0761 \text{ MPa m}^{-2}$ , and  $b$  is  $9.0469 \text{ MPa m}^{-1}$ . It is possible to predict residual stress in this type of brake pads with this equation. Further predictions for higher travel distances are illustrated in Figure 7. Residual stress increases up to 60,000 km of distance and after that distance model shows decrease of residual stress. According to the predictions, it can be stated that brake pads should not be used after that period of operation.

$$\sigma = ax^2 + bx \quad (8)$$

#### 4. Conclusion

In this study formation of thermal residual stress in steel backing plate of brake pads according to operation period is investigated. Steel backing plate rapidly heats up to high temperatures during braking and quickly cools down to low temperatures. Rapid heating and cooling cycles cause formation of residual stresses within the brake parts. High amount of residual stress in brake pads can cause cracks and failures. Investigation of residual stresses is vital for determination of operation life of brake pads. This study also provides a cost effective method for prediction of residual stresses in brake pads.

#### Acknowledgements

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OFP-023

Experimental Study on the Effect of Lime-Powder Addition on Performance of Algerian Swelling Soils

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Abstract

This study aims to analyse the effect of treatment of Algerian swelling soils (the case of Clay of Aïn-Kada in Western region of the country) by incorporating of Lime-Powder. The Lime-Powder was added to the soil as percentages of their dry masse (3, 6, and 9%). The obtained results show that the inclusion of Lime in the soil changes their physic-mechanical characteristics. In presence of Lime-Powder, the soil will be less sensitive to changes of water content.

The treatment of soil with lime reduces of swelling phenomena and consequently improves the mechanical properties of the clay. Although the optimal lime-powder content to add should not exceed 6%.

1. Introduction

Clayey soils occupy large areas in Algeria. In many cases, these soils are characterized by a high sensitivity to the variation of its moisture condition and also by its high swelling potential: clay of Sidi Hadjres in Eastern region (M'sila), clay of Aïn-Kada in western region (Sidi-Belabbas). The swelling aspect of these clays has led to significant disorders on the structures and roads that were supported. Substitution and replacement of expansive clays with other materials was considered as uneconomic solution and can be very hard to do. The storage of these soils with high volumes can create a serious problem due their direct effect on environment. According to (Chen, 2012) damages attributed to expansive soils movements were estimated of about 2,225 millions of Dollars. The causes of these disorders were mainly due to an inadequate identification of soil (as swellable) and to an incorrect management of this phenomenon during construction (Djedid, 2006). In this context; the search of solutions and techniques to reduce the sensitivity of expansive clays to changes of water content has become indispensable.

The main goal of this study was to investigate the possibility of improvement of the physic-mechanical properties of clayey soils taken from Aïn-Kada region (Algeria) by addition of lime-powder. In this region, damages are frequently appeared in the pavement and structure projects due the high sensitivity of this clay to the variation of water contents. The lime-powder was added with different rates varying from 3 to 9%, by weight of clay. Physical and Mechanical properties are evaluated and compared between them according to the lime-powder contents. In addition to that, the objective of this experimental work was to select the optimal lime-powder that was added to achieve a desired level of performance.

2. Materials

The soil subjected to treatment was extracted from Aïn-Kada, southern region of Sidi Belabbès City, West of Algeria. The geology of this area is composed mainly of limestone formations and clay loam. The physical characteristics of clay loam of Aïn-Kada are shown in the Table 1. The grading analysis of this soil shows that 84% particles have diameter less than 0.088 mm and 20% less than 0.002mm. According to the LCP classification of fine soils (Classification du Laboratoire de Ponts et de Chaussées), the clay of Aïn-Kada was considered as clay with high plasticity.

According to Costet & Sanglerat (1975); Snethen (1980), this clay is considered as highly swellable. For other classifications (Chen, 1988; Dakshanamurthy & Raman, 1973; Williams & Donaldson, 1980), this clay is considered as medium swellable. The Proctor test results carried out according to the standards, show that the Proctor curve has an acute form which confirmed the high sensitivity of clay de Aïn-Kada to changes in water contents.

Lime-powder of Saida region (Algeria) from Erco Factory was used throughout this investigation. This product was frequently used in Algeria for construction and earth works areas and has a specific density of 2. Their chemical composition was shown in Table2.

Table 1. Properties of the clay studied.

<80mm		Symbol	Value
Natural water content		$\omega$ (%)	30.4
Atterberg limits and plasticity properties	Liquidity limit	$\omega$ (%)	54.24
	Plasticity Limit	$\omega$ (%)	29.32
	Plasticity index	$I_p$	24.92
	Consistency index	$I_c$	0.95
MB	Methylene bleu value	MB (%)	6
Proctor test	Maximum dry density	$\gamma_d$ (kN/m <sup>3</sup> )	
	Optimum water content	$\omega_{opt}$ (%)	
Grain size distribution	Clay content (<0.002mm)	(%)	20
	Passing sieve (0.08mm)	(%)	84

Table 2. Chemical composition of the lime used.

SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO	MgO	SO <sub>3</sub>	Na <sub>2</sub> O	CO <sub>2</sub>	CaCO <sub>3</sub>
<2.5	<1.5	<2	>73.3	<0.5	<0.5	0.4-0.5	<5%	<10

3. Results and discussion

3.1. Effect of Lime-Powder on consistency limits

Atterberg limits have a key role in the process of characterizing a fine-grinding soil. Several authors have tried to estimate the swelling parameters from these limits (Chen, 1988; Komornik & David, 1969), Therefore, it is important to study the influence of addition of lime-powder on these limits.

Figures 1, shows the effect of lime powder on plasticity properties; Atterberg limits and plasticity index. It clearly appears that these parameters were affected by the percentage of lime-powder added. The index of plasticity was inversely proportional to lime-powder content, while it is less than 6%. If the incorporated lime was used with higher rates, the plasticity index increases. However, the increase of lime-powder content in soil increases the liquidity limits. Therefore, the use of lime-powder permitted to reduce the deformability of clay.

3.2. Effect of Lime-Powder on methylene blue value

The test of Methylene Blue (MB) consisted to quantify the amount of MB which can be adsorbed by the soil suspended in the distilled water. This test was carried out according to NFP 94-068 standards. Figure 2, shows the effect of lime-powder addition on the VBS values. From the chart, it can be seen that MB values decrease with the increase of lime content. The treatment of clay by the lime induced of changes in the framework of the clay. These results were in agreement with that obtained by Cambi et al. (2012), but they were reported in their study that the variations in MB values remained negligible while the lime content exceeded 4%.

According to Bell (1996), when lime comes into contact with clay, cation exchange occurs between the interlayer cations of the clay particles and the calcium ions of lime. This process leads to a more open framework, reducing dry density and plasticity and making the soil more workable (Cambi et al., 2012).

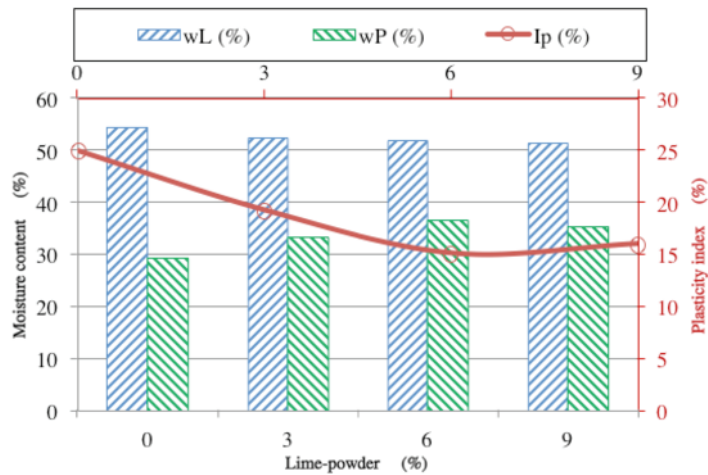


Fig. 1. Effect of lime-powder addition on the plasticity characteristics

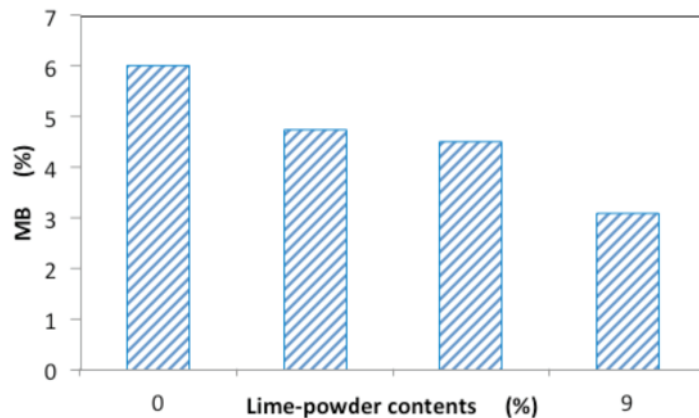


Fig. 2. Effect of treatment of clay on Methylene bleu value

3.3. Effect of Lime-Powder on the Proctor-Properties

In order to assess the effects of lime addition on the clay compaction properties, several modified Proctor tests were carried out on soil treated with lime at different percentages. Figure 3 shows the variations of Proctor curve characteristics (optimum water content and maximum dry density) versus the percentage of lime incorporated. It can be seen that Proctor curve properties were affected by adding lime. There was a tendency to increase in optimum water as the lime content increased. Furthermore, the maximum dry density decreased as the rate of the incorporate lime increased. This was due to the reactivity of lime which requires biggest amount of water compared to untreated soils, in one hand, and to the low density of lime-powder compared with that of clay, in other hand. It was observed also that the Proctor curve became more flattened which reflects the change of clay behavior.

3.4. Effect of Lime-Powder on bearing capacity and swelling potential

The bearing-capacity of soils was considered as key elements for the design of foundations for structures and pavements. Therefore, it is important to analyze the effect of the incorporation of lime-powder on the bearing of clay. This step is often carried out using the CBR test. Clay Samples contained of lime at different percentages and compacted with different compaction energies were used for determining of immediate (unsoaked) and soaked CBR indexes. The compaction effort levels were controlled by varying of the number of blows/layer during compaction. The obtained results are shown in Figure 4.

When the lime was incorporated with rates less than 6%, it has been observed that the bearing capacity was ameliorated. For example, the sample treated with 6% and compacted with standard energy, there was an increase of 95.92% and 34.9% for CBR unsoaked and soaked CBR, respectively.

Samples containing lime powder more than 6%, showed that the bearing capacity of soil decrease. But, it should be noted that the obtained bearing-capacity remained always best than that of untreated sample. In addition, the bearing capacity was highly affected by the applied compaction energy. Therefore, a proper compaction reduced the void contents and also ameliorated the strength.

In term of swelling, the effect of treatment was most notable. It has been observed that the swelling potential was inversely proportioned to lime content as it is less than 6%. Beyond this content the swelling potential was almost unchangeable.

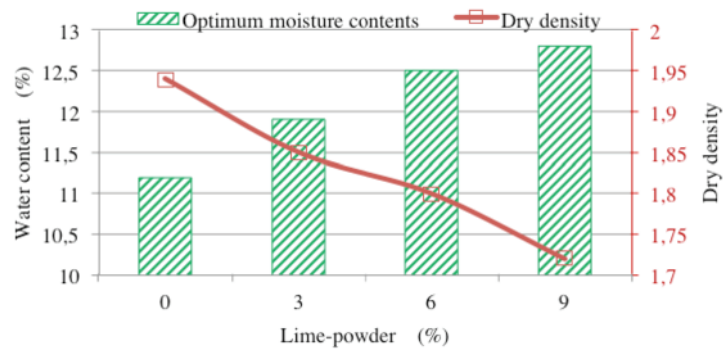


Fig. 3. Effect of lime on Proctor properties.

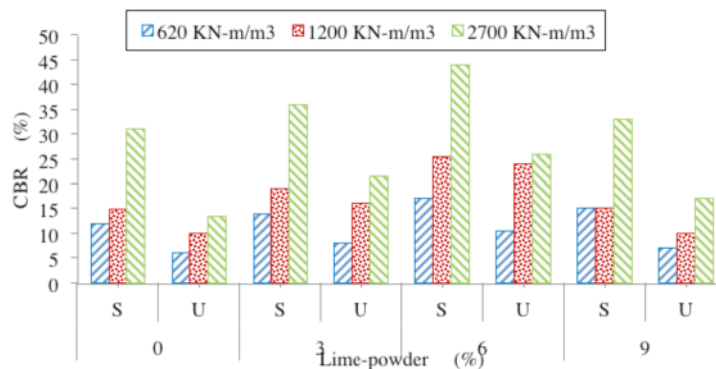


Fig. 4. Effect of lime on CBR indexes (S:soaked, U: unsoaked).

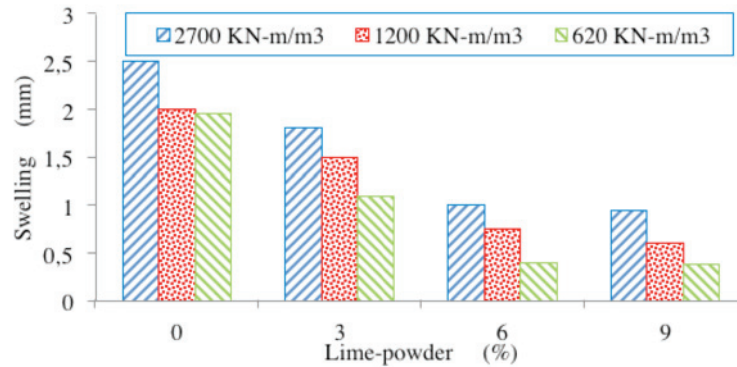


Fig. 5. Effect of lime on linear swelling

#### 4. Conclusion

In light of the obtained results, the clay of Aïn-Kada is characterized by a high sensitivity to water, high swelling potential and low bearing capacity. The incorporation of lime-powder in clay changes their consistency and bearing characteristics. Interfacial contact between lime and clay created cation exchange between cations of clay particles and calcium ions of lime. This process leads to a more open framework, reducing dry density and plasticity and making the soil more workable. The incorporation of lime-powder in the clay with percentages less than 6% (by weight), reduce the sensitivity to water content changes and also minimize the swelling potential. Beyond of 6%, the swelling potential remain unchangeable.

According to the GTR classification, the clay of Aïn-Kada in its natural state (untreated), was considered unusable as backfill material in roads project, due to their its bearing capacity. They do not allow using with sufficient quality guarantees. After treatment by adding of lime, the bearing capacity was ameliorated and the clay becomes usable in earthwork projects, based on the same classification. Therefore, based on the obtained results, the optimal lime-powder content will be used is 6%.

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OFP-024

## Role of the U.S. Economy Driven Innovation Technology and Science Parks Development of the Country

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### Abstract

One of the primary factors in the development levels of national societies of the countries that have advanced technologies. Economic development of the countries at the forefront of technological innovation-driven economies in the area, so the index of innovation, R & D expenditure, health, infrastructure and stages of university-industry cooperation in the host countries, such as venture capital because they become successful. Best example of this, the international competitiveness of the U.S. media for its successful high-tech companies in the center of innovations, including a proven track record technoparks, which is Silicon Valley. A large part of the money into the U.S. economy by about 60% of advanced technological innovations and inventions are exhibited and abroad with the power-up in Silicon Valley is important to provide the brain.

### 1. Introduction

Sustainable economic growth is comprised of a combination of variables with many economic factors. Traditionally, economists the economic growth of the majority of the production factors (labor, capital and land) expressed that it is attached to another part of the economic growth can not be expressed only with adequate explanation of the factors of production factors. The first is the most important determinants of economic development, technological innovation according to these economists. But forward because of technological changes and the problems in the assessment of the contributions on innovation, economic growth, technological innovation, including activities relating to the earlier economic growth, today the technological innovations put forward are considered as the center of economic growth [1].

Three important factor of economic development which are factor-driven economy, efficiency-driven economies and innovation-driven economy. The basic economic factor-driven economies in the lowest stage of development are the environment where some of the natural resources with unskilled labor. Factor-driven economies of host countries, advanced technology instead of developing their own internal structure and assure some other countries. The investment and efficiency-driven economies; providing education and training institutions and the emergence of a certain level of skilled workers in the microstructure is to invest in factors that increase productivity [2].

For reforms related to patent the inventions on display in the new US president has been stated by Obama economic strategy plan in R & D and innovation activities, for innovation-driven economy will shape the future, President Obama's historically more important steps to be taken, for the economy of strategic innovation; basic research, innovation, renewable energy, advanced vehicle technologies, nano-technology, innovative medicine, advanced technology-equipped high-speed trains are highlighted patent reform is very important and strategic planning and legal arrangements will be made in the innovation economy, such as the sea wind farms. The report, "Building Blocks of American Innovation Investment under the heading"; all vehicles that have been reported for successful innovation economy should be sure that in the economic system [2].

The most prominent countries in economic development; innovation-driven economies, ie the index of innovation, R & D expenditure, health, have also been successful because they are always in phase infrastructure and hosting countries such as venture capital and university-industry cooperation. The best example of this; Successful national innovation system is implemented by the US Silicon Valley, they revealed the design of policies. A large part of the money into the US economy is about 60% come from the advanced technological innovations and inventions on display in Silicon Valley [3].

The production of a very successful innovation-driven advanced technology of Silicon Valley and the exhibition of inventions and provide an important cause of the shooting abroad; There is an important role of the US patent reform efforts. Examination of Patent and work towards the reduction of patenting time, the US start-ups and technology-oriented that provides an important environment for entrepreneurs, this favorable environment that allows that allows significantly shooting abroad with the US patent system, so that takes up almost half of the patents to its own organization as well as you need to know that providing brain power.

US silicon valley advanced technologies that play a significant role in taking the body, also for the continuation, to further enhance the patent reform has been the number one item on the agenda of US economic policy. Further economic growth stemming from the US Technopark at the center of technological innovation, the US patent system is known to be very effective.

Technopark in the key building blocks of technological innovations, university-industry known as places where cooperation is experiencing intensely, university or to prepare the ground for the commercialization of knowledge produced under the leadership of research institutions and thus added value in order to achieve high product or aiming to contribute to the economic development of the country; R & D and have innovation-based firms in itself, a position specially designed for local and regional economic development in the international competition and knowledge-based in which production and skilled labor force with high-tech firms, as intended adequate income and demand to provide for sustainable economic development, production-oriented are the places that reveal the R & D activities. Thus, techno parks both in the country to follow the developments in the international level and help the establishment of new advanced technological transfer relationship.

### 1.1. Technopark Concept, Purpose and Functions

Technopark structures existing in each country is different, so make a general description of the technopark is not easy. Although Technopark not even name the common name used in each country, for example, "science park" in Europe "technopark" defined more widely used. The most common are "among other names used research park", "technology park" and "technopolis" is. In our country, often called "technopark" and "Technopolis" names were adopted; the relevant law "Technology Development Zone" has tried to use the expression [4].

Definition is made TTGV also draw attention to the organizational aspects of the technopark. "A Science or Technology Park, the company that is associated with the main objective being to the community or region where the internal and institutions based on the information to promote innovation culture and competitiveness is increasing by and is an organization managed by specialized professionals" [5].

United Kingdom Science Park Association (USPA) established by techno-parks; establishing relations with the university or a higher education institution or a research center in technology based companies and to encourage the formation of organizations and are designed to contribute to growth, government units, within the established firms that provide support for technology transfer, land, buildings and advanced technology based companies and is an initiative composed of institutions [6]. Also the same institution technopark "Technology is a transfer initiatives." Defines the form and specify the actual technology transfer activities. Techno parks are areas that have important roles in ensuring university of technology transfer between industry-government and the main purpose is to perform the transfer of technology can be understood from this definition.

Castells and Hall (1995: 89), the new style which enables Technopark will provide employment in a specific area and business ability to compete internationally through a combination of high-tech companies, which will provide and survive in the new conditions brought about by the production-based information has been defined as a region of industry [7].

Organizations technopark expressed in different terms because of their purpose in the US Research Park (Research Park), Science Park in the UK (Science Park), Technology City in France and Japan (Technopole, Technopolis) is referred to by the name. In addition, instead of technopark Entrepreneur Center (Enterprice Center), Innovation (Innovation) Center, Industrial Park (Industrial Park), Business Centre (Business Center) as well as the names are used [8].

Technoparks of Babacan were transferred as places established in accordance with the purposes itemized below [9].

- Creation and development of new technology-based enterprises,
- convert investments in research and development activities,
- To promote entrepreneurship,
- Increase the number and types of economic activity in the region,
- Technology transfer support,
- creativity and knowledge to commercialize the university,
- enhancing the training force
- The universities in the region to create job opportunities for graduates,
- to benefit from the Technopark
- paying higher wages to create jobs,
- improve the ability of workers and recognize new chances

Organized by the OECD in 1986, "Science Parks, and Technology Complexes in Relation to Regional Development" are the objectives of Technopolis according to papers presented at the seminar were compiled as follows [10].

- Revitalization of urban environment,
- ensure the growth of employment in high-tech sectors used
- Long-term technology originated as a source of increased employment and small business innovation and provide the discovery of partnership.
- To reduce the disparities between regions
- Local governments have to activate the technological developments
- R & D efforts and contribute to the provision of regional restructuring in the local economy
- ensure the creation of infrastructure for regional innovation efforts
- the research capacity of higher education institutions with regional resources and build more efficient and active relationship between
- local industry by providing environments that stimulate the formation of product innovation and to encourage the modernization
- High-tech firms are defined as centers established to bring to the region.

As apparent from the description provided above, research based in Technopark, closely effective relationships with universities and research institutions, universities and industry, and the establishment of synergistic collaboration between research institutions, turned into innovative products, can be summarized in such a way that the established venues are located close to the university campus.

### 1. 2. Provide the Technopark and Additives

As well as delivering benefits to firms located within Technopark, entrepreneurs, universities, regions and countries provide benefits. These additives are shown below [11].

#### 1. 2. 1. The contribution Entrepreneurs

- Technopark creates synergies between companies and academic institutions.
- the information, the data exchange between partners and even stimulated and developed technology.
- Companies will realize much better ties between university and industry.
- University shall transmit to the scientific knowledge and expertise of the company.
- Technopark provides an important resource to the company network.
- proximity between firms and universities, formal (license and collaboration partners) and informal (scientist mobility, meetings and discussions) creates the possibility of a natural change of the network.
- tax concessions provided to the Company.
- encouraged interaction among firms.



- Technopark provides image and reputation of the company.
- Companies will receive counseling by technopark and universities.
- Technopark, communication with employers, offering photocopying and other secretarial services enable more efficient time allocation to the original target.
- Technoparks, to serve the purpose of life and growth companies, low rental service, appropriate physical environment, incubator and offers amenities such as connections with firms in the local economy.
- Companies also finance the technopark, they receive assistance in marketing and management.
- reduce the cost of consumer research.
- Companies produce more customer-oriented and value-added new products.

#### 1.2.2. University with Additives

- University will receive additional financial resources from the state.
- demand associated with areas related to science and technology company, is a positive factor in stimulating the development of universities and research agenda update.
- Technoparks transmit to society the discoveries in science and technology university.
- Technopark of the interaction with the university innovation ability and capacity to contribute in a positive way, so that the competitive performance is improved.
- technological inventions derived from Technopark creates catalytic incubator environment is transmitted to the production of research.
- Technoparks gives the opportunity to start a business for the commercialization of academic research environment. Without Technopark, it would be impossible to establish the most academic-based firm.
- the distance between Technopark has an inverse relationship between the university's academic curriculum based on applied research.

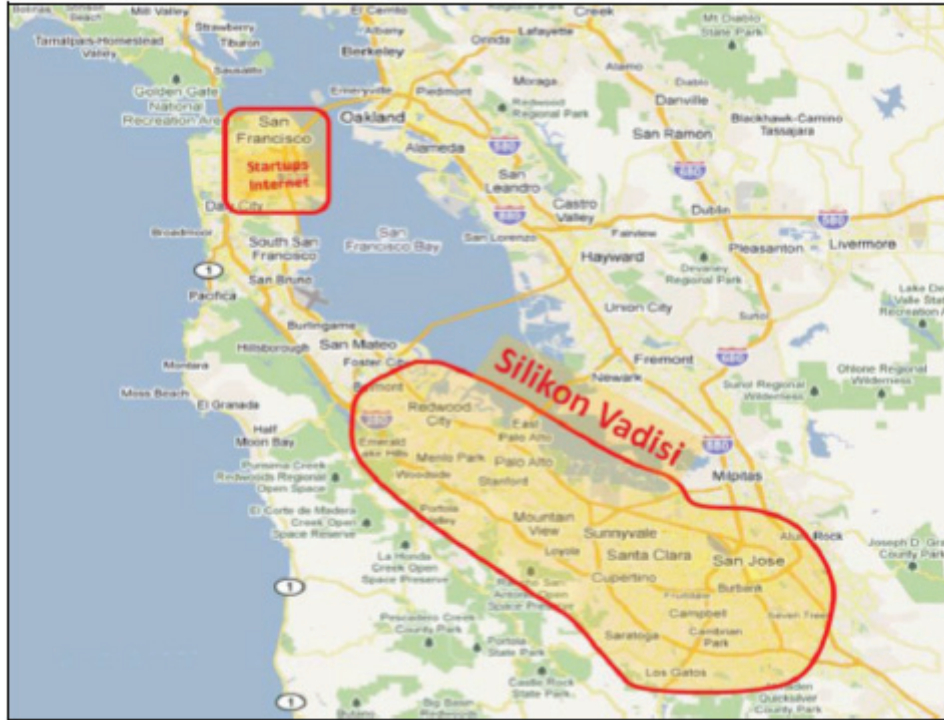
#### 1.2.3. Region with Benefits

- Technopark take the effects of regional differences in the economic development and can be used to benefit from the advantages of specialization besides. A technopark to refocus the entire regional economy or can serve as a catalyst to re-create balance.
- industry and government and other organizations dealing with technological developments, take measures to ensure an appropriate regional for physical space to support economic development in the regions which are in deprivation, techno parks is one of them.
- Technopark increase their employment opportunities in the area where they are installed.
- Technoparks, makes a positive impact on the people living around income.
- Re-industrialization occurs in areas where the establishment of Technopark.
- Technopark where regional development is seen.
- The region's level of education increases.

#### 1.2.4. Those Contribution to Country

- University and close interaction of industry not only provides mutual benefits, but also contribute to industrial competitiveness of the country.
  - The development of high corporate bonds, the country encourages innovation and production capacity.
  - reduce the unemployment rate in the country.
  - increase the country's image and reputation in the world.
  - The country's science and technology level rises.
  - develop specialized labor.
  - The country opens to international markets.
- Long years in the US Silicon Valley, showing activity, Boston-Cambridge-Route 128 Area, Research Triangle Park and other areas of importance in economic development poses.

In the US, for example - Silicon Valley was showed like Technoparks, the first 1950 years appeared in the US. First established in 1952 by Stanford University "Silicon Valley" bears the title of the world's first technopark. The architect of the Silicon Valley Stanford University, Stanford was founded by the family in 1891. In 1939 Encouraged by Stanford University Professor Frederick Terman at Stanford David Packard and William Hewlett University graduates in a small garage in Palo Alto They set up an electronics company, that company known as HP Hewlett-Packard't and the garage actually been the birth place of Silicon Valley. Since then, Stanford, the most important and basic components and the natural inducer of the University of Silicon Valley ecosystem respectively.



Reference: Kit Eaton, The Silicon Valleys of the World

Stanford Research studies conducted several major companies within the University, and has been the driving force behind the establishment and initiatives. In this sense, it is known as the entrepreneurial university. Both scientific research taking place, both in educating entrepreneurs to transform the practice of science, thus creating a mechanism for the creation of innovative applications. This is way out of many large enterprises and innovation of this university. Google, Yahoo, Cisco Systems, Sun Microsystems and Stanford University are among the initiatives developed by the students. Stanford Technopark, known as the Silicon Valley in the US, today computer has an important place in terms of the development of electronic information and communication technologies. In 1983, the number of high-tech companies located in Silicon Valley who the vicinity of 8,000 firms, has been the owner of 60% of the Nobel science prizes in different periods [11].

The world's largest technology base, known as the Silicon Valley, 300 thousand employees, holds over 8 thousand companies and billions of dollars in the hands of the money will flow. Silicon Valley who developed modern management models, built on 100 thousand hectares of land is in a huge data factory. This is more than 8 thousand to implement major technology companies in research and development activities in the city. A total of 300 thousand technical staff has been working for 6 thousand Ph.Ds connected to these companies [12].

Employment in high-tech workers in Silicon Valley, is 285.9 per every 1,000 private sector employees, the average wage rate in the world with 144 800 US dollars to the most advanced Technopark in this field [13].

Silicon Valley is a simultaneous spontaneous ecosystem. Risk-taking tends to be a cultural presence of a high quality with universities around the growing skilled labor, environment that encourages entrepreneurship and has triggered the formation of high-speed flow of ideas in a natural way in this ecosystem. Therefore, high quality, to be entrepreneurial and innovative university facilities that appears as has been quite effective in ensuring that development. University-industry cooperation in the Silicon Valley, one of the factors leading to formation of university-industry collaboration approach has practical importance to be reflected in an effective manner. In achieving this; students will be encouraged to establish the company, the professors will be encouraged to have these companies in board members and advisors, the intellectual property created at the university has been effectively be directed to the private sector to be granted to these companies and professors. In this context, they perform the most concrete example of the entrepreneurial university subjects [14].

Technologically advanced all the wealth of the 70-year-old Silicon Valley hosts its own data of today, is the stage floor since it was first established which reveals.

- District 1 million 381 thousand people working in the company
- 44% of university graduates are working in this area (55% of them are immigrants and 3 times more than the US average)
- 48% of workers in this region know two or more languages. (The US average of 19%)
- 53% of the Company established immigrant background (California average of 39%, while the US average of 25%)
- Silicon Valley, US 2.1% of national income, while the California produces 16% of national income in [15].

In summary, this much of Silicon Valley in the United States the most important factor of success is indicated in the following 6 [16].

- Access to Technical Experts
- Infrastructure
- Establishment Capital
- Labor Movement
- Information Sharing Networks
- Existing Company Formation of New Company (mushrooming, mushrooms)

*The Cambridge-Boston Route 128 Ecosystem in the US;*

In Boston, educational institutions, and especially medicine of this educational institution, is referred to successful research in biotechnology and advanced technology. MIT (Massachusetts Institute of Technology), Harvard University, Tufts University, Boston University, and where more than 50 prestigious educational institutions such as Boston College in Boston, at the same time 'for Life in the country with the cluster and according to the first row in place almaktadır. 2008 data in the world, 6. the world's 12th largest economy in the United States accepted employment in the last 20 years in Boston, the traditional business area has shifted to technology and service-based businesses. Boston's economy largely high-tech, finance, professional services and business services, defense, education, and life sciences are based on the activities of institutions and organizations in the field. Finance in the city center, business services, education and research sectors stand out, in the foreground more advanced technology and defense industry in rural areas [17].

Boston, universities and research institutions, is one of the region made the most contribution to the local economy. Especially graduates of MIT in Boston, which is active in the area are reported to have about 26,000 companies, it is said that these companies have annual sales of around US \$ 2 trillion. City, according to data from the year 2006; Silicon Valley with 191,700 jobs, after New York and Washington has been described as the fourth largest city providing significant employment opportunities in high-tech fields [18].

When we speak of the largest regional economy in the west Silicon Valley of the following comes to mind is that of Cambridge-Boston Route 128 Ecosystem area, taken as a model by other countries, it is noteworthy example of an area to create investment and jobs. Regions, especially faculty members, researchers and students to entrepreneurial atmosphere, and stands out with the success of the newly established technology-based companies provided. In addition to the facilities provided by the University, the region is also growing organically supported by institutions and organizations, technology-based companies, has developed various initiatives to protect the research institutions and entrepreneurs.

As a result of this, of supplying the necessary environment for the development and establishment of new and advanced technology ventures, has emerged in the development of a different dynamic that played a key role. Investors, service providers, regional trade agencies, regional publications, entrepreneurial support agencies, are among the public and private sector institutions and initiatives in the region. Below in Figure 3, the region came together and created a spontaneous impulse is necessary for the economic development of the region, is seen in the nature of institutions and organizations complement each other. Institutions and organizations that make up the ecosystem studied, in the region;

- Educational institutions (Harvard University, Boston University, Boston College, Northeastern University, Tufts University, Babson College, Brandeis University, University of Massachusetts, Worcester Polytechnic Institute),
- Corporate R & D Laboratories (Microsoft, Google, Mitsubishi Electric, Novartis, Pfizer, Schlumberger, Nokia)
- Central and Local Government Initiatives (Life Sciences Cluster, Robotics Cluster etc.),
- Entrepreneur Support Organizations (tie Boston, 128 Innovation Capital Group, Boston Entrepreneurs Network), investors (Venture Capital, Business Angels, Institutional Investors Group, etc.), Regional Trade Associations, Regional Publications, Service Providers,
- MIT Organizations (Deshpande Center for Technological Innovation, Entrepreneurial Mentor Service, MIT Entrepreneurship Center, MIT Enterprise Forum, MIT Entrepreneurship Club (email club)),
- Modular Office / Service (Cambridge Innovation Center, One Kendall Square, Regus) and will allow the development of dynamism in the area of entrepreneurship and innovation is seen as competition.

Leader in research laboratories on the one hand, technology transfer and entrepreneurship initiatives that expert support offices in the commercialization process; the other hand, mentoring, assistance and cooperation, culture, creativity, discover and all organizations in the region with the atmosphere that encourages risk-taking entrepreneurs, the region's investors and business angels constitute the unique ecosystem and intellectual capital. However, compared with the Silicon Valley region; Silicon Valley venture capital firm in the network is larger and has a fundamental structure, of which the research institutions and laboratories as well as large companies are reported to be in partnership with local start-up companies. In contrast, the Cambridge-Boston Route 128 atmosphere, young and not so attractive for foreign entrepreneurs and the region's technology is said to miss the phase transition from the personal computer mini computer. However, Route 128 region, the country in attracting venture capital funds are currently the second largest region and is said to be particularly serious in the field of biotechnology and health sciences rule [19].

Cambridge-Boston Route 128 ecosystems identified in the Harvard University-Technology Development Office, the commercialization of inventions and innovations at Harvard University and to develop strategies to protect and demonstrate strategic activities to put into practice. Office, in particular, funding of researchers in universities, industry relations (contract research, by way of establishing licensing and new firms), patenting, company formation, the potential for commercialization of research evaluation and the idea is to meet the needs in the areas of protection of intellectual property rights. Master's and doctoral degrees with, including lawyers, patent and business development specialist with 40 people work in the office through the years has been reported to be around 80-90 patents. Harvard University-Technology Development Office at the same time, 'Technology Development Accelerator Fund "provides an early stage fund name. According to Harvard University Harvard University Technology Transfer Process intellectual property rights policy, all the rights of study at the university belongs to the university. However, researchers can benefit from the license fee received as a result of the commercialization of research and goodwill. Usually to the researchers, 50% of income (personal payments and the laboratory equipment etc. To) be paid. This ratio is expressed as compared to many US universities a higher rate.

Technology Development Accelerator Fund ;; Today the commercialization of research results in several specific areas and the biggest obstacle in front of the transfer to industry, is reported that the gap between early stage research results and proof-of-concept data. Harvard University, to fill this gap, and researchers have not yet established the Technology Development Accelerator Fund to provide funds needed in the early stages of immature technology. The strategic objective of the Fund is developed at Harvard and hopes to ensure the transfer of new and more efficient use of the licensed technology promises. The Fund has invested in the first three years a total of US \$ 4 million to 23 projects in the university, a project has been transferred to a commercial agreement with the industry in the first year, so that 'Harvard Technology Development Accelerator demonstrated the success of the model. Accelerator is intended to be a sustainable and self-sufficient funds, transferring funds still accelerator is based on the income derived from licensing. For the year 2011, funds under US \$ 100,000-150,000 -h project is divided chiefly US \$ 1 million. This, as well as that taking place in the life sciences area of the vast majority of technology transfer at Harvard cause a privilege and of research in molecular chemistry 'Pilot Grant's name at about 10000-25000 USD (3-6 months) are allocated . From project applications, industrialists and investors are evaluated by an Advisory Board consisting of businessmen, the board also provide the necessary advice and guidance to researchers [20].

Raleigh and Research Triangle (Research Triangle) Ecosystem; Located in the Research Triangle region of North Carolina Park (Research Triangle

Park, RTP), both successful businessmen of the region and to trigger the state's economic development, was founded by representatives of public universities. RTP, in the heart of Raleigh-Durham, Duke University, North Carolina State University and North Carolina-Chapel Hill is located between the University's campuses; universities, international companies and research institutions, effective synergy with fed young technology-based firms and economic development model that creates them is to go forward.

For the development of advanced research-based competitive cooperation in the region's top technology parks that provide the appropriate environment, the total amount of USD 1 billion is invested in, are given the opportunity to work with more than 37,000 people. Of the total annual salaries paid to people working in rtp' is said to be approximately US \$ 2.7 billion [21].

Austin Ecosystem; Austin is the capital of the state of Texas, Texas is the fourth and the US, is the largest city in fifteenth position. Between 2000-2006, has attracted attention as the 3rd fastest growing city in the United States. Which is home to more than 90 research units, annual research expenditures of \$ 500 million last, with 400 patent, one of the nation's largest universities with graduate schools are the University of Texas at Austin. Development as a science and technology center in Austin and to be among the most important ecosystems in the United States, in 1977, operates under the university IC2 (Innovation, Creativity, Capital) began with the establishment of the Institute. IC2 Institute of the development and to ensure prosperity 'undetermined' problems has been established to develop the theoretical and practical solutions. The theories and hypotheses developed here, great 'in Austin laboratory tested. Institute of science and technology and economic development, arguing that firms is an important source for growth, has acquired two goals in the initial stage itself. The first of these; 3 in Austin in a very short span of years, providing high income to create jobs, while the other; Is determined as to fill the vacant office space in Austin.

IC2 Institute / IC2- Innovation, Creativity, Capital Institute IC2 Institute, especially theoretical and practical studies on entrepreneurship, which is one of the research unit of the University of Texas. Among the models developed in IC2, 'Austin Technology Incubator (Austin Technology Incubator),' Business Research Bureau (The Bureau of Business Research) ', Global Commercialization Group (Global commercialization Group) as tested by practical applications and programs are highlighted. The main objectives of the IC2 Institute, stands as an obstacle to wealth and regional development to identify important structural problems and research, science and technology have been expressed as to prove that the main source of economic development. The work of the Institute,

- Development of Austin model for economic development,
  - preparation of industry reports to selecting the appropriate technology investment to the region,
  - provide the necessary strategic technological assistance to entrepreneurs and job creation in Austin to provide high added value for the development of the incubator of Technology,
  - to educate Entrepreneurs 'Technology Commercialization' on the creation of graduate programs,
  - IC2 Institute for Global Partner Program and has focused on the establishment of global connectivity and international research projects [21]
- Austin most important factors that the success of the model,
- public, business and the development of leadership and success factors that will bring together academia,
  - Technology, capital and the creation of a strong community structure is dominated by the know-how
  - Benchmarking and has been able to develop suitable indicators for progress and reporting.

Austin Technology Incubator, ensure that researchers understand the company formation process and to identify best practices are established again as a laboratory. The establishment of incubators and graduate students, defined by the company in a targeted structure can be found in the mutual communication, but also helped develop a synergy with the local public and professional organizations of the University of Texas. However, most importantly, the IC2 Institute, firms located in the incubator for technology transfer, finance, has created a network of know-how that can help in areas such as marketing. IC2 Institute, for regional development, business, government and academic circles have increased the growth of high technology combines. IC2 Institute, Austin seeing catalyst in the economy, Austin and Texas in the conversion to the advanced technology base has played a key role. Institute of success laid out, going to a major restructuring, Austin model, began testing in the world. GCG at the IC2 Institute of Finance (Global Commercialization Group), provides consulting services to various organizations and institutions in many countries. On the one hand, the ecosystem of the region and the dynamism of a very important part of the Texas Emerging Technology Fund advanced technology in the early stages in the region firms, public-private partnership will demonstrate the power of government and industry and to provide a good research environment provides support to higher education institutions. In the 1950s, only Austin highlighted by a good research infrastructure, followed designed in accordance with the regional policy today technological entrepreneurs, transfers and technology-based successful technology has reached the start-up made its also called the company and the position. Austin the most important elements that make the difference in the models of the development and high-tech loyalty as the region's premier leaders to make the home have revealed that the proposed development model for goodwill and regions have been very brave way of testing and implementation. Austin in this way, although with large investors or business angels networks in the Cambridge-Boston, develop models of technology transfer and apply ecosystem has had a chance to put forward. Austin ecosystem as a result of this success, after Silicon Valley and Route 128 in Boston was one of the most discussed in the literature cited [21].

Austin Located in the ecosystem University of Texas, more than 90 hosts in the research unit, the annual research expenditures of \$ 500 million the previous 400 the owner of the patent, is one of the universities with the largest US graduate schools. University of Texas at Austin's biggest employer in the same time, more than 59,000 jobs and 8.2 billion US dollars in the amount of economic activity reveals. Occurred as a result of technology transfer activities at the university, the income derived from licensing and goodwill has found 26.7 billion US dollars by the year of 2010. The university has filed over 1,000 patents last 5 years, it has also provided 3 take place in the ranking of countries on the university's patent applications. Chevron, ExxonMobil, Intel, Cisco, Abbott, Samsung, BASF, Boeing, Lockheed Martin, big companies like Merck and Pfizer, is sponsoring the research and development activities amounting to 60 billion US dollars at the university [21].

Office of Technology Commercialization; University of Texas operates as a sub-unit of the Technology Commercialization Office, has been operating on the market in order to transfer the benefits of the invention for--society at the university. Among the MBA duties, evaluation of the developed inventions and software at the university, intellectual property rights protection, marketing and licensing, establishing of start-up firms, industry, investors and the development of relationships with other actors located in the transfer ecosystem technology, patent protection of researchers in universities and commercialization processes is located to be informed about. Data relating to the Technology Commercialization Office of patents and licensing process are listed below.

Texas Emerging Technology Fund; By Texas Council in 2005 to investigate new technologies to Texas, development, and started a font to provide

a unique advantage in the commercialization. Regarded as being a public fund responding to early stage financing needs of high technology firm value is a fund in support priority is for the project issues in Texas needs (green energy, such as basic infrastructure, affordable housing), and the community and to provide added value to education comes. Fund to mobilize different mechanisms; the high-tech companies in the early stages, university, public funds are given to demonstrate the power of the industry and public-private partnerships and to research which aims to provide a good environment for higher education institutions. Created by the multiplier effect and prominent fund with contributions made to the state of Texas research and technology development activities and also in the best researchers in the world to be brought to Texas, so be directed to improving the capacity of educational institutions in Texas and Texan students key research areas in order to 'Research Superiority Acquisition Awards' is providing a special support. Fund so far, 132 have invested in early stage companies in the amount of US \$ 196.2 million, from other sources, the impact that led to the transfer of 407 million USD. The Fund also Texas universities and public-private partnerships in support of the 173 million US Dollars have been found [21].

### 3. Results

That the relationship between economic development and high innovation performance is reported to have a large impact of technological developments on the US growth. In particular, globalization, the increase in competition, rapid rise in the information and communication technology businesses under the influence of factors such as advanced technological and scientific developments are to go to a high level of innovation.

The new President of the United States economy plan announced by Obama and innovation activities to highlight important in this context is made. Innovation in the economy in question, it is stated that an important technological innovations of the US's economic development model. The separation is very significant in terms of innovation economics resources for basic research for the National competition and the new business areas and to provide global competitive advantage in start-ups and technological innovation-oriented provides a good environment for entrepreneurs, so that employment in the industrial development by enabling shooting from abroad will increase and the development of the US economy is reported to play an important role. Similarly, the future of innovation President Obama's historic steps to be taken for the economy, basic research, however, energy, advanced vehicle technologies, information technology, education, US \$ 100 billion is specified budget allocated to high-speed trains and technological innovation programs. In addition to the commitment of President Obama to devote funds to these issues, energy efficiency standards, such as the sea wind fields are highlighted in the innovation economy regulations will be made. The report, "Building Blocks of American Innovation Investment under the heading"; All vehicles which are required to successful innovation economy is emphasized that the results should be sure that in the economic system [22].

The impact of innovation and economic development as well as increase productivity and reduce costs; in particular to ensure efficiency in the use of raw materials, new sources of raw materials will ensure the emergence of social welfare standards rise, increasing quality, new markets unraveled, product and shortening of the service of production time, through effective and efficient use of resources by increasing entrepreneurship in the economic growth is positively affected. Technopark on the importance of innovation in economic development at the center gradually increased, up to that consciousness countries have started to focus more on regional innovation. Regional innovation system, regional innovation, clustering is an important strategic approach to network and to build the basic tools such as technology. Innovation activities to increase regional and national policies determined, the design of strong regional innovation strategies and the need to support the formation of a system compatible with the strategy to be developed accordingly [23].

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## Technical Decision Making for Governments in Developing Countries: The Need for an Industrial Engineering Approach

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### Abstract

Technical Decision Making including the management of the technology is a serious challenge not only to business but more critical for Governments due to large amount of money tied up with such decisions. Enormous number of alternatives with large number of conflicting criteria's makes the final selection more complicated. Decision making under such conditions demands not only the experience but a deep understanding of theory behind taking decisions. Such understanding of theory cannot be inculcated in all the decision makers due to nature of Government structures particularly in developing countries. A quite common case is the wrong selection of the technology or underutilization of the selected technology without reaping all the competitive advantages it offers. This paper provides an Industrial Engineering based theoretical framework to assist Governments in technical decision making process, with a special focus on developing countries. The case of 3D printing is also presented to elaborate the view point.

### 1. Introduction

Decision making process not only entails complete understanding of the system but also the evaluation of impact and consequences of the decisions made. Several tradeoffs appear due to the conflicting criteria which ultimately transforms decision making from an art to a science. The experience no longer remains an only qualifying criterion but mastery and understanding the skills of good decisions becomes an indispensable criteria. According to Saaty (2012) in complex situations a greater margin of error is possible while making tradeoff decisions. This may confuse the leaders due to the assorted information given by the assistants.

Improving quality and productivity is a serious challenge which manufacturing and service sector is facing and at the same time is the top priority of any Government to effectively utilize the public funds. First and utmost requirement to meet this challenge is to understand the system and how every component of the system contributes to achieve the system goals. High level of analytical skills along with relevant tools and techniques are required to analyze and adjust the components of the system to achieve the desired objective. Savory (2005) argues that Industrial Engineers use the knowledge of mathematics, engineering business, administration and management to design processes and system that improve quality and productivity. Achieving high quality and productivity required competitive strategies coupled with designing of such a man-machine system, which help to achieve better competitive position. Such man-machine system further require specialized knowledge in areas like technology management, process design etc.

Command on such a verity of skills is not possible in any other specialized field like Engineering Physics, Economics etc. where the focus is on that particular component design rather than the system optimization. Training of individuals of different backgrounds undeniably adds value but apparently looks limited to the improvement in knowledge level only. This is similar to, if an engineer attends a course on Dermatology; this will create awareness about the skin problems but cannot lead towards the practice. What will happen if one start practice or giving expert advice? In such scenario, it is not difficult to understand the consequences.

Based on the above discussion, a Government owned Industrial Engineering Department is suggested. The mandate of such department should not be to act as a watchdog but to assist other Government Departments and even business in the areas of technical decision making like strategic policy making, roadmaps development, technology selection and adoption, productivity improvement initiatives and mechanisms, economic evaluation of projects etc. One critical domain of industrial engineering is technology selection and adoption. According to Niles (1982) "*Analytical work done by Government can be carried out by industrial engineers from any organizational position i.e. Bureaucracy. Industrial engineering can be matched to large enough portfolio of problems and opportunities to guarantee analytical talents applied where it is most effective*". The importance of such department is also highlighted by UN Sustainable Development outcome document which stresses on the importance of participation of scientific and technological community for sustainable development. The document stress on nourishment of collaboration between academic, scientific & technological community with a different focus on developing countries to close the gap between developing and developed countries UN (2009). Next section discusses the issues and challenges of one of the vital domain of Industrial Engineering i.e technology selection, by giving the example of an emerging technology 3D printing. This case can be treated as tip of the ice berg and will help to understand the creation of such department at Government level.

### 2. Technology Selection Challenge

Technology selection is a challenge which every organization faces including all manufacturing, service departments like hospitals, educational institutes working under the Government. Technology selection is linked with selecting the best alternative amongst the available whereas the technology adoption connects the selected technology with the business strategies to achieve the competitive advantage. In a study Koen (1997) explained the technology planning as "*Technology planning is often a journey into uncharted areas of customer needs, competitors, capabilities and requirements. However, many begin this journey with no clear idea of terrain and obstacles. The path is poorly communicated, and technology staff gets lost and are focusing their expertise in the wrong direction*".

Technology management is hard to find in curriculums so it can be well imagined that how the issue is handled especially in developing countries. Ali *et.al* (2008) explained that issue of technology management in developing countries is surrounded by poor business models, government conditions, low education, poor management of technology whereas the business detailed knowledge about the technology is normally absent.

3D printing is an emerging technology which has revolutionized the manufacturing in last decade. The comments of Ping Fu (Advisor to US President on Innovation) are sufficient to describe the significance of the technology as “3D printing is as big as internet: as big as steam engines” BBC (2013).

Following report by Farooq Baloch and published in the Express Tribune on December 1, 2013 is enough to comprehend the severity of the issue in Pakistan.

*“Even though 3D printing has been around in the global markets for over three decades now, the concept was alien to Pakistan until a couple of years ago. The duo established Robotics Labs in Karachi, the only modern scientific learning centre in Pakistan so far. The laboratory is helping young children learn about the latest technologies, which include but are not limited to 3D scanning, modeling and printing”.*

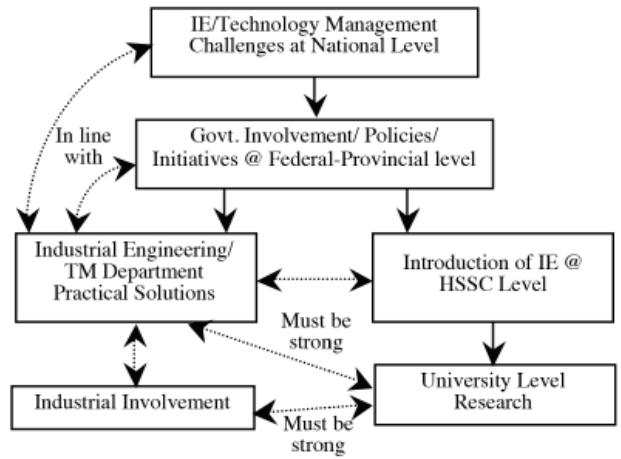


Figure 1: Framework to meet the IE/Technology Management Challenges in Developing Countries

The government owned IE development not only can assist business in technology selection and adoption but can also act as an advisory to Higher Education Commission, informing them about the latest trends in technology, devising roadmaps for industry and at the same time can suggest improvement in curriculums to accommodate such changes. This will help educational institutes and students to align with emerging trends and technologies. Figure 1 shows a proposed framework for the establishment of the IE department and its possible links with other business/government functions.

**3. Challenges and functions of Government owned Industrial Engineering (IE) Department:**

*3.1.1 Technical Decision Making Challenges:*

Before going into details, it is imperative to study the existing system which is responsible for taking technical decisions. Decision making in now a day is a complex science and is much more than an art. Practically a decision making requires a best fit between number of criteria and variety of alternatives. As the number of criterions and alternatives continue to increase, decision making gets more and more fiddly. Under such circumstances the experience of the decision maker is not enough to make judgments as it converts into a next phase which is the science of decision making. A deep insight is required to understand the selection and career advancement mechanism of key decision makers which are normally civil servants.

Civil servants come from versatile backgrounds e.g. medical, engineering, social sciences, management etc., after a general competitive examination scores. Based on scores and interview marks they get placement in different departments and receive similar training at one place. Even though they pass through different types of short training courses but the question arises at this stage is that do such short courses make them skilled and equal to experts in that area? Can a novice attending a short course on Technology Management is able make virtuous technology related decisions? It is common that they seek advice from experts in different area or from universities but the whole process is quite informal and depends on the judgment of that individual. The point here is not to filch the authority of civil servants but to facilitate them in the technical decision making process including technology related decisions. This creates the justification of Government owned Industrial Engineering department which can support different state departments to make practical and feasible solutions.

*3.1.2. Role of Government owned IE Department:*

The first and the important clarity about such departments that they should only act as enabler and should be directly answerable to Head of Province in case of provincial and to the Federal Minister at federal level.

A clear mandate should be given to such department to call/include experts from all areas through strong university /industry linkages. Such department can also be helpful in strengthening the academia-industry linkages. It also can serve as a contact point between academia and industry which will strengthen the linkage between them, where department can refer certain problems to universities. The department can perform following function initially which can be expanded later based on performance and future requirements.



i) Analysis of the current performance of the Government departments based on the industrial engineering principles and identification of any shortcomings.

ii) One of the observed issues is that department/industry is normally good enough in setting targets but fail in defining the means to achieve them i.e. developing a complete roadmap. IE department can not only assist in developing roadmaps but can also identify indicators against which the progress can be monitored.

iii) Usually the performance is determined based on output alone without understanding of outcome. Such projects look feasible in papers but practically have no or minimal value addition. The IE department can assist in determining the outcome clearly along with outputs.

iv) Provide assistance to other departments in technology selection and adoption related decision. A huge sum of money is tied up with the wrong selection of technology, which is even hard to determine as such things do not come on surface.

v) Expert advice regarding the latest trends in technology, future direction of research, up gradation in university courses, new software etc. can be given to the relevant authorities.

### *3.1.3. Introduction of Industrial Engineering/Technology Management at HSSC levels;*

Manufacturing and service systems are blend of man machine with varying degree of complexity. So it is not hard to assume technical decision making is a challenge which one has to face regardless of their occupation. The introduction of this science of decision making must be started at HSSC level and should be converted into detailed modules in all disciplines at undergraduate level. Increasing productivity and producing better quality is one of the great challenges which both manufacturing and service organization are facing around the globe for a better market share. Optimization in every single component of the system can only be achieved when the people looking after such components not only understand the gravity of the issue but also have the ability to make better decision. Systems can only be improved when every member of the system have contribution towards the system uplifting. Virtuous working of few departments or personnel only results in partial improvements. It is therefore recommended that at least a single module of "System or Quality Thinking" must be an essential component of any curriculum offered at undergraduate levels.

## **4. Conclusion**

The economies of the world are facing serious threat of shrinking. The grimmest challenge is to balance the growing expenditures with the income. Growing population mainly in developing countries is a serious danger for administration to achieve this balance. Another concern for developing countries is to maintain the pace of development in all areas to minimize the gap with developed nations. This situation stresses to make smart decisions with the support of science in every functional area. People possess different backgrounds so ultimately have different decision making ability. Experience alone cannot be considered as a qualifying criterion particularly in complex decision making situations. Capacity building of all the decision makers is a daunting task and a hard to achieve target. A new approach is presented in this paper to minimize the cost linked with bad decisions. It is also recommended that research should be conducted to determine the real cost of bad decisions, which will ultimately help to draw stern attention on this neglected area.

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## OFP-026

## Solid Fuel Derived from Microwave Irradiation Pyrolysis of Empty Fruit Bunch for Co-Combustion with Coal

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### Abstract

An experimental study on pyrolysis of empty fruit bunches (EFB) was performed under microwave irradiation treatment for solid production as blending material with coal. The shredded empty fruit bunch was exposed to microwave irradiation using a modified domestic oven of 2,450 MHz within an inert atmosphere. The investigations were done at various power levels (300, 600 and 1000W) and exposure time (10, 15 and 30 min). Solid yield was found to increase with power and decrease with exposure time. The reported calorific values of the char produced were comparable with that of a low rank coal. Additional experimental runs on combustion of the EFB char with Mukah Balingian coal was also performed using thermogravimetric analyser (TGA) for blending ratios of 50:50, 20:80 and 80:20 at heating rate of 20°C/min. The differential thermogravimetric (DTG) for the combustion of EFB char only shows one evolution peak with comparison to EFB biomass. The reactivity of the EFB char was found to be similar to that of Mukah Balingian (MB) low rank coal. Upon blending with Mukah Balingian coal, the reactivity of the blend was slightly increased while the maximum evolution temperature ( $T_{max}$ ) lowered by 50°C

### 1. Introduction

An increasing electricity in developed and developing countries has lead to an increase in green house gases emissions such as carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) and other pollutants (NO<sub>x</sub> and SO<sub>x</sub>) being released to the atmosphere as a result of combustion of fuels, namely fossil fuels such as oil, gas, and coal. In order to cope with the fuel crisis, and taking part in minimising environmental impact globally, Malaysia has gradually moving forward, towards utilising coal to replace petroleum based fuel for power production. In the year 2012, the fuel mix for power generation by a national energy power producer, Tenaga Nasional Berhad (TNB), the usage of coal was already at 36%, as compared to previous year at 33.3% (Tenaga Nasional Berhad, 2012). On a long term period, coal will have a greater contribution in Malaysia's energy mix at about 40–45% in comparison to that of natural gas with contribution of less than 50% (Rahman & Lee, 2006). Malaysia is currently importing coal from Indonesia, Australia and China, with 60% of the imports is from Indonesia (Energy & Resources, 2012). Under National Mineral Policy, government is promoting utilisation of local fuel for such usage. Locally, coal reserves are approximately 1.9 billion tonnes, which 81% of the reserves are located in Sarawak, 19% in Sabah and the balance in Peninsula Malaysia (Energy Commission, 2014). This in turns has become the motivation in seeking for alternative fuel that can perform as good as or even better than the existing fossil fuels. For that reason, it is inevitable that Malaysia also need to seek renewable sources for future energy generation.

In an attempt to reduce carbon dioxide emissions, the use of renewable fuel to replace fossil fuel has been widely accepted worldwide. This scenario in turn, affects many industries especially the energy-based industry. For this reason, renewable fuel such as biomass is recognized as an important energy source that is sustainable for future use. Malaysia is blessed with favourable climate conditions, which prevail throughout the year that have made Malaysia as prime player in the palm oil industry. For the year of 2013, approximately 5.3 million hectares of land under oil palm cultivation and it is the main contributor to biomass resources in Malaysia (MPOB, 2013). As of the year 2014, approximately 437 palm oil mills operated in the country, which produced substantial amount of lignocellulosic biomass in the form of mesocarp fibre (PMF), empty fruit bunches (EFB) and palm kernel shell (PKS) (MPOB, 2014). It was estimated that the amount of solid wastes produced could reach 39 million tons by the year 2020 (Yusof, 2006). The empty fruit bunches (EFB) are known to have high moisture content thus, are less desirable for combustion in the boiler as compared to palm kernel shell and mesocarp fibre. Thus, it is the purpose of this research to improve the disadvantage of this material so that it will be as fuel and at the same time, this waste can be converted into high value products.

Pyrolysis is one of the methods of converting the biomass into chemicals and products of different fraction such as solid, liquid and gas can be potentially used as fuel. The solid products can be converted into solid fuel such as charcoal; the only problem is the production of charcoal is a slow process, which takes hours or even days. Manipulating heating source such as microwave energy is one of the alternatives of producing char at faster rate. Previously, several researches had emerged on pyrolysis of biomass using microwave radiation such as pyrolysis wood blocks (Miura, 2004), oil shale (El Harfia, 2000), plastic wastes (Ludlow & Chase, 2001), pine saw dust (Chen et al, 2008) and coffee hulls (Dominguez, 2006). Dominguez et al. (2006) had compared the pyrolysis of coffee hulls using microwave as energy source in comparison to conventional heating pyrolysis. It appeared that the time taken to pyrolyse the materials to a particular temperature is lesser than that in conventional pyrolysis. They found out that the gas fraction is increased accompanied by a decreased in solid fraction. Nonetheless, the heating value of solid fraction is similar to that of lignite.

Many researches using microwave, as heating source in pyrolysis process appeared to focus on upgrading the liquid and gas products but not on the solid product. Thus it is the aim of this work to investigate the possibility of converting the oil palm waste particularly empty fruit bunches into solid char using microwave irradiation pyrolysis for co-combustion of this char with low rank coal.

## 2. Methodology

### 2.1. Materials

Malaysian oil palm biomass namely empty fruit bunches (EFB) was obtained from oil palm mill located in Nilai, Negeri Sembilan. The collected samples were air dried under the sun for 2 – 3 days for ease of shredding process. The low rank coal i.e. Mukah Balingian coal (originated from Sarawak) was used for the coal: biomass char blending during combustion using TGA. Chemical analysis of the sample is performed as per ASTM Std. method and is shown in Table 1.

### 2.2. Experimental Set-up and Procedures

Dried EFB was pyrolysed in a fixed bed quartz reactor that was exposed to microwave energy. The system consists of a quartz reactor of an ID of 13 cm and height of 15 cm. The lid of the reactor was also made of quartz with three openings for the gas inlet and outlet, and thermocouple insertion. This reactor is placed in the centre of the cavity of the domestic microwave oven of 2.5 GHz and 1000W. A type-K thermocouple was inserted in the quartz reactor and in the microwave cavity. One of the thermocouples was used to measure the temperature of the bulk sample in the reactor, whereas another one is to measure the cavity temperature. The reactor was continuously purged with nitrogen gas to ensure oxidative free atmosphere.

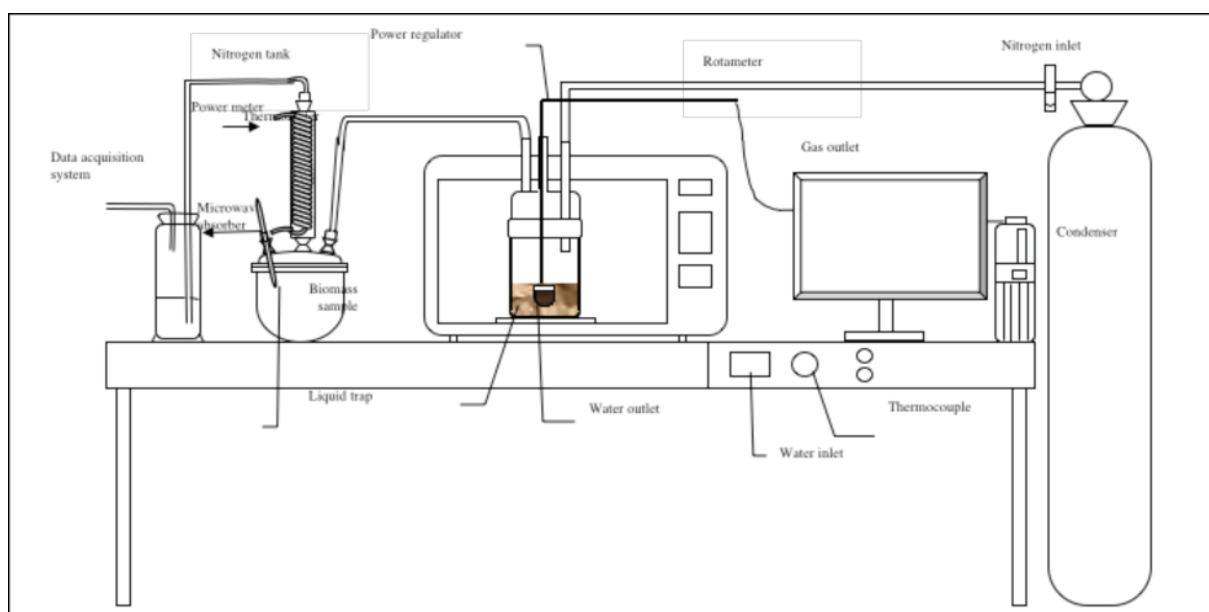


Fig. 1 Schematic diagram of microwave irradiation pyrolysis system

EBB of 20g was placed in the quartz reactor and a crucible containing 5gm of char (obtained from charcoal) was placed in the centre part of the sample. The char acts as microwave energy absorber, as biomass is known to be very transparent to microwave energy. The reactor was purged using nitrogen (5L/min) as carrier gas for 30 minutes to ensure all oxygen was expelled from the system. Prior to the experiment, the nitrogen was fixed to 1L/min, then the exposure time and power level was set at a desired level. Upon completion, the reactor was set to cool down to room temperature. The sample was then weighted and char collected was kept in screw tight bottle. The experiment was carried out for power level of 300W, 600W and 1000W at various exposure times of 10, 15 and 30 minutes.

The chemical analyses of the solid product (EFB char) are performed as in Sec. 2.1. As for coal: biomass char blending during combustion, a thermo balance TGA/ SDRA51e manufactured by Mettler Toledo was used for the pyrolysis experiments. The experiment was performed for weight ratios of MB coal: EFB char of 0:100, 50:50 and 100:0. The method of combustion has been previously described (Idris, et al., 2012). The thermograms were analysed to obtain important combustion parameters such as maximum rate of weight loss ( $DTG_{max}$ ), ignition( $T_v$ ), peak( $T_{max}$ ) and burn out( $T_p$ ) temperatures and burning time( $t_p$ ).

Table 1. Chemical Analyses of EFB, MB coal and EFB char

	Proximate (ad) (wt %)				Ultimate Analysis (daf) (wt%)					CV (MJ/kg)
	Moisture	Volatile Matter	Fixed carbon	Ash	C	H	N	S	O	
MB	6.4	39.6	50.1	3.9	54.4	5.3	1.7	0.3	38.3	24.6
EFB	8.5	70.5	15.4	5.6	40.9	5.4	1.6	0.3	51.8	16.5

ad= as determined basis; daf= dry ash free basis; \*Calculated by difference

### 3. Result and Discussions

#### 3.1. Behaviour of Pyrolysis of EFB

The pyrolysis of EFB starts after ~1-2 minutes upon exposure to the microwave energy, which indicated by the rapid vapour released. During this period, the temperature reached approximately 200°C. The time taken for the rapid vapour evolution was dependant on power level. At lower power level, the vapour was released after 5 minutes. In general, after ~ 1 minute from the rapid vapour released, the vapour cloud disappear and sign of incandescent (exhibit bright red colour) started to appear. This indicates that the pyrolysis process has started to take place. At this point, the temperature has rose to about 1000°C then slowly reduced and maintained at temperature of 700°C (for the case of 1000W) until the end of process. Similar behaviour is observed at different power level, only, which, the constant temperature region is different.

#### 3.2. Product yield.

Table 2 shows the products yield and chemical analyses of EFB char at different power level and exposure time. In general, microwave pyrolysis produces high gas product followed by solid and liquid (Dominguez et al., 2006). The solid char yield in this experiment varies from 23 wt% to 37.8 wt%. Similar findings has been reported by Abdullah et al. (2010) on EFB using fluidised bed fast pyrolysis system. It appeared that the char yield decreases with power and exposure time. Higher char yield at low exposure time, for 300W power level, indicates that the material is not fully pyrolysed. Apparently the solid char yield is decreased with exposure time for for all power level, though the difference was not so distinctive. It is important to note that at exposure time of 10 minutes do not allow the EFB to be fully pyrolysed. From Table 2, it has been observed that the characteristics of solid product produced (i.e. char) were improved as compared to its parent material. The fixed carbon content increased with power and exposure time. Similarly the calorific value of the char also improved with respect to its raw counterpart indicating improvement of fuel heating value on pyrolysis. The CV of char at 1000W is almost similar to the low rank coal (Mukah Balingian) (ca. 24MJ/kg). In a particular combustion process, to ensure auto combustion of fuel, the calorific value should be at least a value of 20MJ/kg (Biagini, 2008). In this case, the solid product (i.e. char) is a potential bio coal and can be used as fuel sources in combustion system as the calorific values are above 20MJ/kg.

Table 2. Products yield and chemical analyses of EFB char at different power level and exposure time.

Power Level W	Exposure Time min	Char yield wt%	Liquid yield wt%	Gas yield	Proximate Analysis (ad) wt%				Ultimate Analysis(ad)(wt%)					CV (MJ/kg)
					Moist	VM	FC	Ash	C	H	N	S	O	
300	10	37.8	38.0	24.3	9.6	26.4	41.6	22.5	53.5	1.6	1.0	0.0	43.9	21.7
	15	29.3	47.0	23.7	8.1	25.0	54.2	12.7	59.9	1.8	1.1	0.0	37.3	22.1
	30	25.8	53.8	20.5	7.4	22.8	59.3	10.4	79.8	1.4	0.7	0.0	18.2	26.1
600	10	25.0	29.0	46.0	6.2	19.1	55.9	18.7	57.3	2.1	1.2	0.0	39.5	21.7
	15	24.0	38.0	38.0	8.3	15.5	59.7	16.5	58.2	1.6	1.1	0.0	39.1	22.7
	30	23.5	41.6	35.4	7.6	22.9	55.8	13.8	72.4	1.4	0.7	0.0	25.6	26.7
1000	10	25.0	41.5	33.5	9.4	16.9	56.0	17.6	56.2	1.9	1.2	0.0	40.6	20.8
	15	24.0	41.0	35.0	7.8	18.9	58.4	14.9	58.5	2.1	1.2	0.0	38.2	22.8
	30	23.0	38.2	38.8	8.3	12.0	63.8	16.0	62.3	1.4	0.9	0.0	35.4	23.0

ad= as determined basis; daf= dry ash free basis; \*Calculated by difference

#### 3.3. Combustion analysis for EFB, MB coal, EFB char and their blends

The solid product is further analysed with combustion via TGA and compare its characteristics were compared with that of raw EFB and MB coal. Apparently, the combustion of EFB char from microwave irradiation pyrolysis is distinguished than raw EFB. Figure 2(a) and (b) showed the DTG for combustion of EFB and EFB char in comparison to combustion of MB coal at heating rate of 20°C/min. As can be seen, the EFB char when undergo combustion, produced a single evolution profile that is quite similar to that of MB coal.

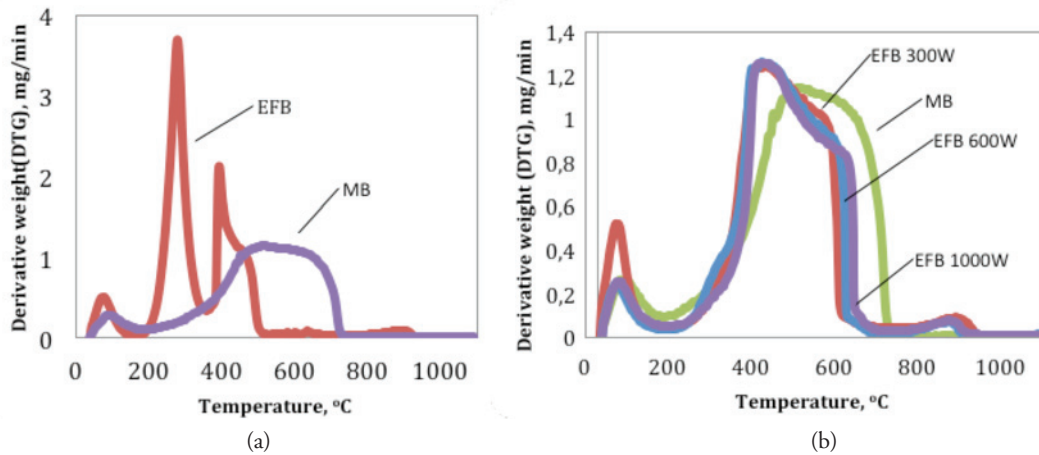


Fig. 2 (a) DTG curve for combustion of EFB & MB coal at heating rate of 20°C/min, and (b) DTG curves for combustion of EFB char at different power level in comparison to MB coal at heating rate of 20°C/min

The effect of power level and exposure time on the combustion characteristics are tabulated in Table 4. The ignition temperature of the EFB char samples was higher than that of EFB and slightly lower than that of MB coal. The higher ignition temperature of the EFB char could be due to the high carbon content and low volatile as compared to the raw EFB. It appeared that the power level and exposure time have less influence to the ignition temperature but not on the peak temperature. Peak temperature ( $T_{max}$ ) is conventionally considered as important parameter to evaluate the reactivity of fuel combustion (Sahu et al., 2010; Miranda et al., 2008). It is an indication of how reactive the fuel is or vice versa. The higher the peak temperature, the less reactive is the fuel. From the table, the  $T_{max}$  is generally decreased with increasing power level, whereas the  $DTG_{max}$  is increased with power level. The values for  $T_{max}$  and  $DTG_{max}$  fall within the same range of those obtained in similar research using conventional pyrolysis (Sahu et al., 2010). Mean reactivity ( $R_m$ ) of the EFB char sample was directly proportional to  $DTG_{max}$  and inversely proportional to peak temperature (Miranda et al., 2008; Idris et al., 2010). Apparently, the mean reactivity of the char samples increased with the power level and exposure time with a value of 0.2719 to 0.426 mg/min°C. The char samples from 600W and 1000W completed the combustion at about the same time and followed by the one produced at 300W. Even though through visual observation, all the EFB turned black after pyrolysis at this particular time and power level, nevertheless, the material may not be degraded fully. As evident, the volatile content of the char at 300W and 15 minutes was higher than those in different power level of the same exposure time.

Table 3. Combustion characteristics of Mukah Balingian (MB) coal, EFB and EFB Char at heating rate of 20°C/min.

Materials	$T_v$ °C	$T_{max}$ °C	$DTG_{max}$ mg/min	$R_m$ mg/min°C	$T_f$ °C	$t_q$ min
MB coal	394.20	479.80	1.18	0.25	777.80	29.3
EFB	249.10	278.30	3.48	1.25	960.00	39.2
At 15 min. exposure time						
EFB CHAR (300W)	356.50	437.60	1.19	0.27	951.40	38.6
EFB CHAR (600W)	353.80	426.90	1.23	0.29	921.00	36.9
EFB CHAR (1000W)	365.90	423.00	1.48	0.35	920.00	36.7
At 1000W power level						
EFB CHAR (10 min)	364.99	412.00	1.35	0.33	950.00	37
EFB CHAR (15 min)	365.90	423.00	1.48	0.35	920.00	36.7
EFB CHAR (30min)	366.72	399.00	1.70	0.43	919.50	35.8

$T_v$  = Ignition temperature;  $T_{max}$  = peak temperature;  $DTG_{max}$  = Maximum rate of combustion;  $R_m$  = Mean reactivity;  $T_f$  = Burn out temperature;  $t_f$  = burning time.

To investigate the possibility of blending the char with coal for co-combustion application, the char at 1000W for 15 minutes exposure were mixed at equal proportion with a Malaysian low rank coal i.e. Mukah Balingian. Figure 3 depicts the DTG curves for combustion at heating rate of 20°C/min of raw EFB, EFB char, MB and 50:50 blends of MB: EFB char, and MB:EFB. Upon blending with MB coal, the blended MB:EFB char blend exhibit only one peak in the burning profile, which is similar to that of MB coal burning profile. In fact the MB:EFB exhibit two peaks which is similar to raw EFB. It can be deduced, the blending of EFB char to low rank coal will give much benefit to the combustion process due to its reactivity which is much closer to that of coal as compared to the raw EFB. However, the data is not sufficient to provide information on the synergistic effect between the EFB char and MB blend upon combustion. Further investigation on this behaviour will be carried out.

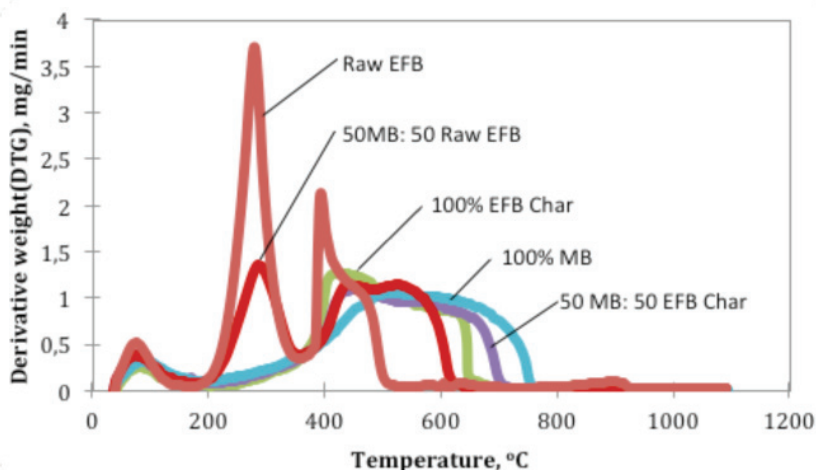


Fig. 3. DTG curves for combustion at heating rate of 20°C/min of raw EFB, EFB char, MB and 50:50 blends of MB: EFB char, and MB:EFB

#### 4. Conclusions

As a conclusion, microwave irradiation pyrolysis is a useful technique in converting waste to energy especially in dealing with high moisture material such as empty fruit bunches. The characteristics such as fixed carbon and calorific value of the solid char produced were improved as compared to its raw counterpart. Furthermore its combustion with low rank coal had showed improvement as compared to the combustion of the raw EFB with coal. This in turns will help in reducing the dependency on solid fossil fuel such as coal and environmental impact from combustion of such fossil fuel. Besides that, it is also an alternative solution to the utilise industrial wastes such as EFB.

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## OFP-027

## Development of Injection Moulding of Cobalt Based Alloy Powder for Potential Orthopedic Applications

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### Abstract

Metal Injection moulding (MIM) is an advanced near net shape forming process for high quality of complex shapes combined with high properties of materials. The concept of the MIM is based on mixing of the fine powders with a small proportion of polymer to form a feedstock that can be moulded. The granulated feedstock is then giving shape using injection moulding machine. After shaping, the polymer binder is then removed from the moulded part without significant disturbing the powder particles. Then, the powder is sintered at high temperatures. This paper presents the attempt to manufacture hip stem prototype using CoCrMo alloy powder by MIM process. Co-Cr-Mo alloys are increasingly being used as metallic materials for orthopedic implants. For example, a Co-Cr-Mo casting alloy has been used in the femur component of knee joints. A wrought Co-Cr-Mo alloy has been used in components such as hip heads, hip stems, metal-on-metal hip joint bearings, and knee stems. The CoCrMo alloy powder with the median particle size of 15  $\mu\text{m}$  and a binder consisting of paraffin wax and poly ethylene were mixed at 160 $^{\circ}\text{C}$  using a sigma-blade mixer for one hour to prepare the feedstock of the test bar and the viscosity was measured using a capillary rheometer. The test bar was injection moulded using vertical injection moulding machine with the nozzle temperature of 200 $^{\circ}\text{C}$ . Prior to sintering, the specimens were debound using a combination of solvent extraction and thermal pyrolysis method. The specimens were then sintered under vacuum at the temperature of 1390 $^{\circ}\text{C}$ . The properties of the sintered bar such as physical appearance, densities and strength were presented and discussed.

### 1. Introduction

Metal injection moulding (MIM) has been widely recognised as an advanced technology for the fabrication of complex-shaped, low cost and high performance components. Fine powders, less than 20 micron in diameter, are mixed with suitable thermoplastic binder and formed into the desired shapes. The binder aids the flowability and formability of fine metal powders during moulding, and they have to be removed in the next stage to enable high density components to be produced. The removal of the binder is done either thermally in the furnace or by solvent extraction. Ideally, the removal of the binder would open up pore channels which allow accelerated removal of the higher boiling point components. The components are sintered following the debinding stage. This stage is crucial to the MIM process as appropriate sintering conditions would ensure pore-free structures that have good mechanical properties. [1,2,3,]

Cobalt-chromium alloys are commonly used for surgical implants because of their high strength, superior corrosion resistance, non-magnetic behavior and biocompatibility [4]. Applications include prosthetic replacements of hips, knees, elbows, shoulders, ankles and fingers, bone plates, screws, staples, and rods; and heart valves [4]. Joint endoprostheses are typical long-term implants, and the applied implant material must therefore meet extremely high requirements with regard to biocompatibility with the surrounding body tissue material and corrosion resistance to body fluids [4]. Various in vitro and in vivo tests have indicated that the alloys are biocompatible and suitable for use as surgical implants [4,]. Materials properties for various Co-Cr-Mo compositions and processing routes are covered by a number of ASTM specifications [4]; such as ASTM F75 for common composition and can be cast, ASTM F1537 for wrought and forged by ASTM F799. At least three methods of manufacture are used to make Co-Cr-Mo implants: precise (lost wax) casting, hot forging and powder metallurgy [1]. Casting is often selected for surgical implants processing route while for high volume applications, metal injection molding (MIM) is applied. The purpose of this study is to investigate the processing characteristics of injection molding of Co-Cr-Mo alloy for hip stem applications using MIM process

### 2. Methodology

The 90 % CoCrMo alloy powder used in the present study was obtained from Sandvik, UK. The mean particle size distribution was determined using HELOS Particle Size Analysis WINDOX 5 and around 15 micron. A scanning electron micrograph showing the powder morphology is indicated in Figure 1. The powder was mixed with a natural polymer based binder (palm stearin) at a solid loading of 65-volume % for injection molding. The binder system consists of 70-weight % of palm stearin (PS) and remaining 30-weight % of polyethylene (PE), which represent the remaining 35-volume % based on previous study. [5,6,7] Mixture of powder and binder were dry mix followed by the entry into the Z-Blade mixer heated to 160 $^{\circ}\text{C}$ . The mixing was left for 1 ½ hour. After mixing has completed, the heater was shut off and the feedstock was allowed to cool with the mixing blade still in motion. This procedure gives a granulated feedstock.

The granulated feedstock then injected into hip stem prototype using a simple, vertically aligned and pneumatically operated plunger machine, MCP HEK-GMBH. Feedstock was fed into the barrel and then injected through the nozzle in the mold cavity. Test bars were successfully molded at temperature of 200 $^{\circ}\text{C}$  at pressure 300 bar. The dimensions and weight including density were measured in order to determine the solvent removal and shrinkage after sintering. The densities of the specimens were measured using water immersion method.

The hip stems were debound by a two-step process where at the first stage the samples were solvent debound in order to removed all the wax portion of the binder, in this case palm stearin which is consist the major fraction of the binder. Molded samples termed the green body were arranged in a glass container, which then immersed in heptane and held at temperature 60 $^{\circ}\text{C}$  for 5 hours. The glass container was covered to prevent evaporation of the heptane during extraction. Subsequent thermal pyrolysis was performed in Lynn Furnace. The thermal debinding cycle consisted of 0.1 $^{\circ}\text{C}/\text{min}$  to 450 $^{\circ}\text{C}$  and soaking for 1 hour before furnace cool. Sample that completely undergoes thermal debinding termed the brown body. The components were sintered

in vacuum furnace with the heating rate at 10°C/min to the sintering temperature 1390°C, and held for 1 hour at this temperature before cooled down by furnace cool. The dimensions, density and weight of the sintered specimens were measured to calculate sintered shrinkage and final density. Tensile properties of the sintered samples were determined using an Instron Series IX Automated Materials Testing System. The ultimate strength and elongation were measured at strain rate of 0.1/s [8].

### 3. Results and Discussion

#### 3.1 Feedstock Preparation and Rheological Study

All the particles were approximately spherical, as indicated in Figure 1. Some particles are large spheres and some are very small. Easier molding and a high solids loading are favored by spherical particles [5]. The spherical shape of the particles will result in higher packing density, easier molding. Small particles agglomeration is a common problem. Nevertheless, with the presence of the larger particles will reduce the agglomeration problem where the smaller particles will fill the voids between the large particles without forcing the large particles apart.

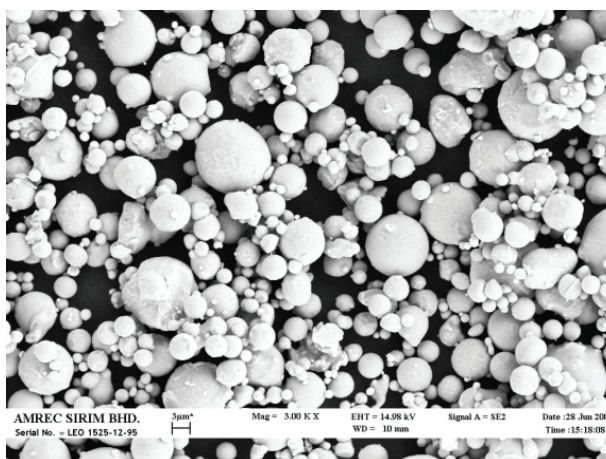


Fig. 1. A scanning electron micrograph of CoCrMo alloy powder.

The concentration of powder had an important effect on the torque-evolution-curves as can be observed in Figure 2. Three powder loadings ranging from 60 vol.% to 65 vol.% of gas atomized CoCrMo alloy powder were evaluated by using the same formulation of binder system, 70 wt.% PS and 30 wt.% PE. It is generally desired that the feedstock should have the highest powder loading possible in order to obtain high green density and strength, and to minimize the subsequent sintering shrinkage

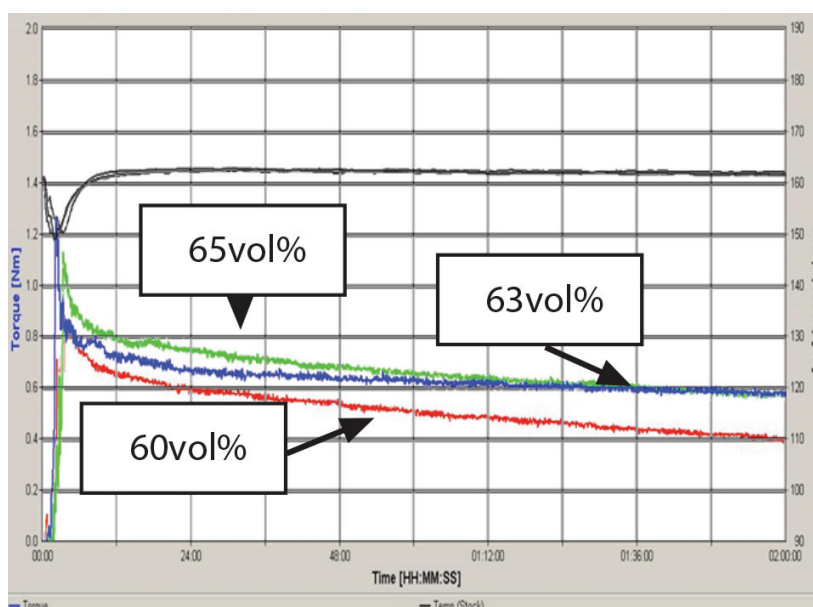


Fig. 2: Mixing torque as a function of mixing time at 50 rpm and 160°C

It shows the changes in torque as a function of mixing time. The mixing torque, proportional to the shear stress of the mixer indicates that the work energy is consumed to disperse and distribute the powder in the binder. The mixing time is defined as the time required for a mix to reach this steady state. It clearly shows that the torque value increases as the powder loading increases from 60 vol.% to 65 vol.%. This circumstance explains that greater friction occurred at the higher amount of powder loading that results in a higher viscosity of the mixture. For powder loading of the 65 vol.% and 63 vol.%, the torque stabilizes at a steady level in a short time, indicating a uniform mixing. As a contrast, the 60 vol.% of powder loading took a longer



time for the torque value to stabilize. This indicates that a homogeneous mixing is attained with a longer mixing time of 40 minutes.

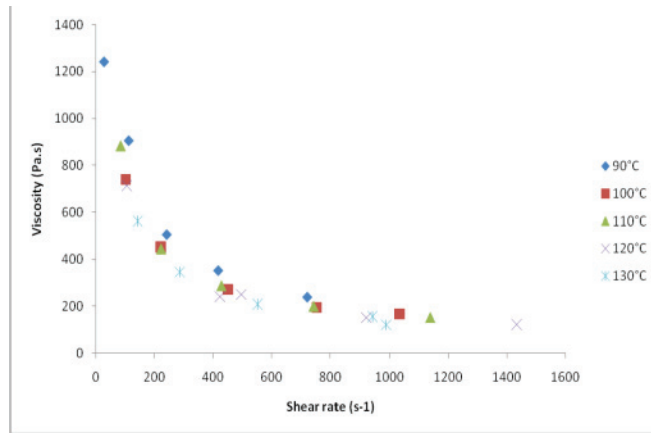


Fig. 3: The graph of viscosity versus shear rate at different temperature for 65 vol. % of powder loading

The graph of viscosity versus shear rate for 65vol.% of powder loading formulations of PS and PE at different temperatures are shown in Figure 3. It shows that increasing the shear rate results in decreasing the viscosity which is favourable with pseudoplastic flow. Almost all data exhibited good viscosity even at a high temperature tested of 130 °C. The range of viscosity is between 1200 and 200 Pa.s. The feedstock containing PS/PE binder system has a good fluidity at high temperature. This can be observed during the experimental work at 110 °C to 130 °C.

### 3.2 Injection Moulding of the Feedstock

The detail of the processing parameters during injection is in Table 1. All the injected hip stem prototypes were good and free from normal defects such as short moulding, obvious flashes at the parting surfaces and obvious separation between the powder and binder as shown in Figure 4

Table 1: Moulding parameters (optimum) for producing hip stem component

Moulding parameters	value
Injection temp	200°C
Injection pressure	300 bar
Cycle time	10-15 sec
Mould temperature	Room temperature



Fig. 4 Injection moulded of hip stem

Figure 5 indicated a scanning electron micrograph of the green body sample. It can be clearly observed that the binder fills practically the interstitial spaces among the powder particles. As can be seen, there are few voids presence between the particles. The presence of the voids was due to air bubbles that entrapped during mixing or molding. Furthermore, the powders particles are linked to each other by a network of binders consist of polyethylene as the backbone binder together with palm stearin. The networks impart sufficient green strength for the handling prior to debinding and sintering.

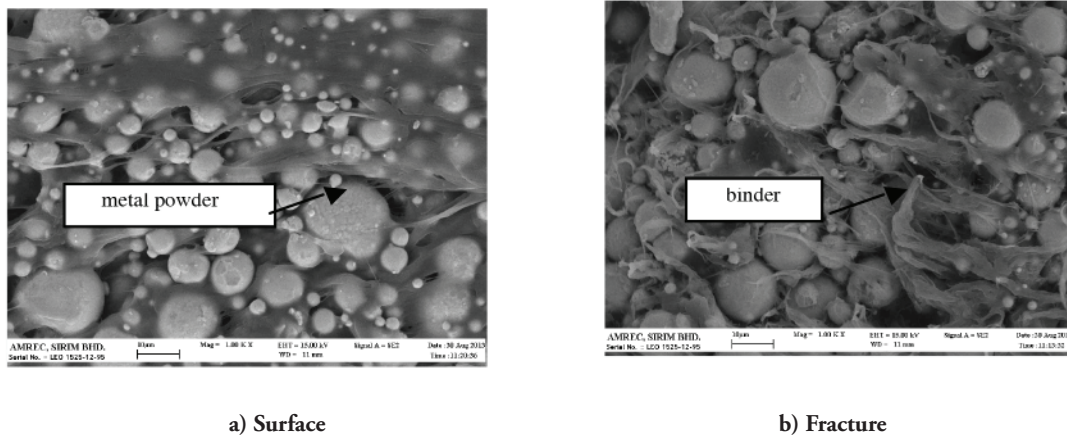


Fig 5. The scanning electron micrograph of the green body after injection molding.

### 3.3 Debinding Process

To minimize the possibility of defects with safe and fast binder removal, solvent debinding followed by thermal debinding was used. The multi-component binder chosen includes the lower stability components of palm stearin wax which is removed in early stage of debinding and generate pore channels inside of the part that allow gaseous products of degradation of remaining binder harmlessly diffuse out of the structure while PE has a function of holding particles together during and after extracting lower stability components to maintain the part shape. Solvent debinding was carried out by means of heptane as a solvent at 60 °C only for 5 hours. It is considered that after removing 40% of binder, there exists some interconnected capillary porosity inside of samples which makes leaving of gaseous products in subsequent thermal debinding easy in short time. Since nearly 70% of palm stearin was removed in solvent debinding step, subsequent thermal debinding can be performed with higher speed in comparison with usual thermal debinding process.

Different heating rates and sintering environment were performed to optimize the suitable heating rate can used later. The test samples were thermally debond successfully at temperature 450°C and dwell time 1hr. The reason of selecting this temperature was complete decomposition of binder in the previous study (). Five different heating rates were used from 1°C/min to 10 °C/min to select for debinding process. It was observed that at heating rates 1°C/min, 0.5°C/min, 0.3°C/min and 0.1°C/min were study to optimise the thermal pyrolysis stage. It was shown that only 0.1°C/min gave the best appearance without any blistering on the surface, as shown in Fig. 6a. However, when the heating rate was increased from 0.1 to 1°C/min the swelling and cracks appeared on the surface of the test samples as shown in Figure 6-b. Based on these results, it was considered that the most suitable heating rate for debinding rate is 0.1°C/min. From room temperature to 450°C, the temperature increased by 5°C/min and held at that temperature for 1 hour, which removed the binder system used



Fig. 6. a) Comparison of dimensions of hip stem after solvent extraction and thermal pyrolysis. Test samples subjected to heating rate 0.1°C/min at temperature 450°C for 1 hr show no defects. b) Thermally debound test sample subjected to heating rate 1°C/min at temperature 450°C for 1hr shows swelling and cracks

### 3.4 Sintering Process

A sintering temperature of 1390°C was chosen for densification of the test bar in vacuum atmosphere. Pores are eliminated as part of particle bonding during high-temperature sintering [1,2,3]. Sintering densification normally take place close to the me melting temperature of the material, where the bonds of the particles are bonding together by the atomic motion of the individual atoms via either solid state or liquid phase. As the temperature arises, the atomic motion occurs faster. Likewise, sintering temperature differs for each material. This powder is usually sintered slightly above its solidus temperature; however, the solidus temperature varies depending on composition, especially carbon content [1]. Sintered sample properties are shown in Table 2. The high packing density of the F75 powder resulted in high final density that is 8.20 g/cm<sup>3</sup> with the strength of 735 MPa. As can be seen, the samples average properties are almost the same as ASTM F75 [4,8], as shown in Table 2

Table 2. Sintered properties for injection moulded CoCrMo alloy powder

Properties	Value	ASTM F75
Density (g.cm3)	8.20	8.28
Ultimate tensile strength (MPa)	735	699
Elongation, %	10.4	>8
Hardness, HRC	38	>30

### 4. Conclusions

Through some modification on some MIM processes, the MIM process has successfully implemented the CoCrMo alloy powder. Moulding and debinding process is quite a critical stage in MIM for cobalt based powder due to the thickness of the hip stem prototype. The sintering process of injection moulded CoCrMo powder specimen is clearly influenced by sintering temperature. With a high sintering temperature, the density shrinkage, tensile strength and the hardness of the sintered specimens increase due to the pore shrinkage. The physical and mechanical properties achieved comply with the International Standard, ASTM F75.

### 5. Acknowledgement

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**OFP-028**  
**Electronic and Magnetic Properties of Low-Spin States**  
**in Mn-doped MgO**

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### Abstract

The local spin density approximation with Hubbard-like coulomb term based on first principles calculations are used to investigate a substitute doping of transition metal Mn in MgO to obtain the electronic and the magnetic properties for the low spin solution ( $S=1/2$ ). The gap does not change by adding the Mn impurity. In this case the majority spin  $t_{2g}$  band is occupied with three electrons by the way the minority spin  $t_{2g}$  is partially occupied which leads to a half-metal material.

### 1. Introduction

Many years ago, the simple structure of magnesium oxide remains a very interesting material. It is very used in the domain of optoelectronics in the manufacture of components to operating in the blue spectral region. Moreover, in the field of spintronics, it is used in the manufacture of magnetic tunnel junctions MJT where it presents, in theory, a tunnel of magneto resistance effect 100% of (TMR) (Butler, Mathon and Umerski), while in combination with two thin layers of iron (Fe/MgO/Fe) it presents, in practice, 200% of TMR (Yuasa et al, and Parkin). Magnesium oxide is a non-magnetic material. But when it presents intrinsic defects its total magnetic moment increased; it moves from  $0\mu B$  to  $1.95\mu B$  with a deficient concentration of Mg 3.125% (Gao). The presence of non-magnetic impurity such as carbon C, nitrogen N or even Boron B also makes a ferromagnetic material of MgO (Bannikov, Kuang) In the recent years, the doping of magnesium oxide with transition metals knows very intense studies (Shi, Narayan et al) to find stable material which has a half-metallic property. Generally, the doping magnesium oxide with transition metals provides high spin states. In its stable configuration MgO:Mn has a solution with high spin  $S=5/2$ . In this work, we aim to study the solution with low spin  $S=1/2$ , a less stable solution that was proposed by (Sharma) by using the LSDA+ $U$  approximation, a solution which our calculation gives rise to a half-metallic material.

### 2. Material parameters and Method of calculation

In its ground state magnesium oxide is an ionic material, insulation and non-magnetic which belongs to the family of wide band gap semiconductor. (Wolf, Bertaina, Bannikov) Its structure is that of rock salt (fcc) with an experimental lattice parameter  $a = 4.213\text{Å}$  (Speziale et al). In this configuration and in an octahedron each cation Mg is surrounded by six anions O and vice versa. Optical measurement of the energy of the band gap gives a value of 7.83 eV (Whited) Our calculations are based on density functional theory (DFT) with the LSDA+ $U$ , where we will add the Hubbard correlation term that takes into account the strong correlation of electrons in the  $3d$  shell of transition metals (Anisimov). We will use the calculation code WIEN2k (Blaha) based on the full potential linearized augmented plane wave method (FP-LAPW). [21] Electrons in the valence states are used: Mg (3s and 3p), O (2s and 2p), and Mn (3p, 4s and 3d). A supercell  $2 \times 2 \times 2$  which contains 32 atoms is used to calculate the electronic and magnetic properties of Mn doped MgO. With our calculations we chose  $R_{MT} \cdot K_{MAX} = 8$  where  $R_{MT}$  is the radius of the muffin-tin sphere and  $K_{MAX}$  is the maximum modulus of the reciprocal lattice vector. The muffin-tin radii of the elements Mg, O and Mn are respectively 1.97, 2.08 and 1.85 in calculations of the LSDA+ $U$  are performed with a value of  $U_{eff} = U_j = 6\text{eV}$ . In the code WIEN2k fundamental magnetic state of the manganese is  $S = 5/2$ , we can modify it to have the desired state of the  $S = 1/2$ .

### 3. Results and discussion

Magnesium oxide has a cubic crystal field that divides the two states  $3d^5$  du Mn in tow state, low energy  $t_{2g}$  triplet and a doublet  $e_g$  high-energy state. In its normal configuration ( $S = 5/2$ ) states are filled as follows  $t_{2g}^3 e_g^2$ , where there are no minority spin in the valence band. With the low-spin solution filling is different where  $t_{2g}$  minority spin state is partially filled Fig.1. This solution ( $S = 1/2$ ) and with a previous calculation [22], is achieved with a lower lattice parameter equal or 3.69Å, which corresponds to compression of 134GPa. A compression comparable to that of the passage of a NaCl structure (B1) magnesium oxide to the CsCl structure (B2) (Liu et al).

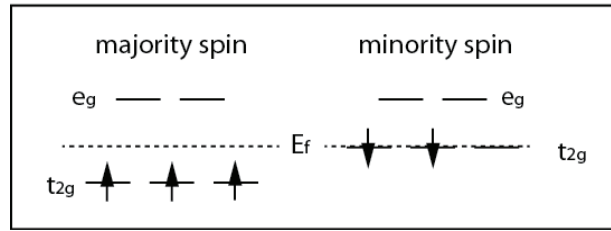


Fig.1. Schematic diagram of energy band for  $MnMg_{15}O_{16}$  in low spin solution.

For our calculation of lattice parameter that minimizes the energy of the Mn doped MgO is around  $4.187\text{\AA}$ . Calculate the spin gap in this configuration gave us a value of  $5.0\text{eV}$ , which is a characteristic value of the pure MgO obtained with other calculations ( Ashcrof, BAltace ), which means that the introduction of the Mn atom has no influence on the energy width of the forbidden band gap. The energy band gap is clearly visible in figures 2 and 3.

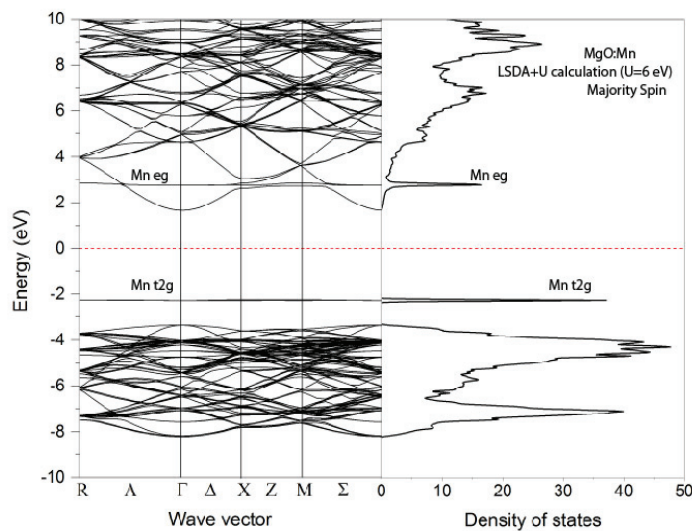


Fig.2 Band structures (left) and total density of states (right) for majority spin (configuration low spin).

Figure 2 shows that the semiconductor material remains for the majority spin states while it becomes metallic for minority spin states as shown in Figure 3, a peak appears exactly at the Fermi level. It is a property of semi-metallic materials, the majority spin state of the  $t_{2g}$  ( $2.26\text{ eV}$  Fig.3 ) is occupied with three electrons.

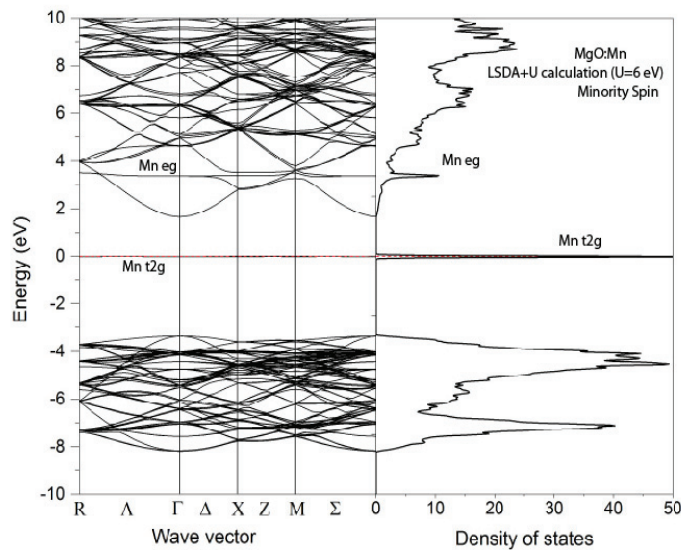


Fig.3. Band structures (left) and total density of states (right) for minority spin (configuration low spin).

Therefore, two electrons remain in the minority spin  $t_{2g}$  band, which is partially filled resulting in a half-metallic behavior. The half-metallic behavior leads to a ferromagnetic coupling between the different sites of impurities by the double exchange mechanism.

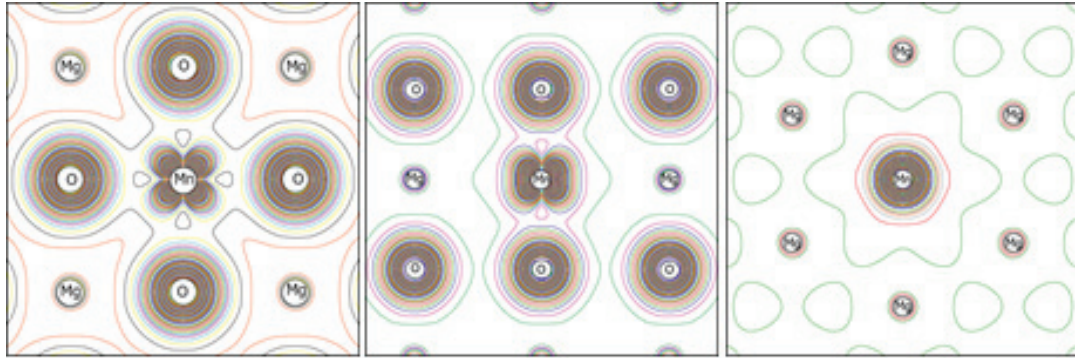


Fig.4 Valance electronic density of Mn doped MgO (S=1/2). From left to right: plane (100), (110) and (111).

Table. 1. Magnetic moment of Mn-doped MgO in low spin configuration.

Site name	Mg	Mn	O	Total
m $\mu(B)$	0.00	0.95	0.01	1.00

The electron density in Fig.4 shows that the Mn atom is responsible for the total magnetic moment of the structure with a contribution of  $0.95\mu_B$  Mn atom which essentially represents the Mn3d while the nearest neighbor oxygen a contribution of  $0.01\mu_B$  of O atom, with virtually zero contribution from the second neighbor near the Mg atom, the values are given in table 1.

#### 4. Conclusion

In this work, we have studied the electronic and magnetic properties of the MgO:Mn in the least stable configuration (S=1/2 spin down solution) using the first principle calculation with the LSDA+U approximation. It has been shown through calculation that the low-spin configuration actually has a half-metallic behavior which is mainly due to the double exchange mechanism of 3d state of Mn and 2p state of O. The presence of two magnetic solutions, one stable and other less stable may have an influence on the distribution charge carriers in the MJT applications.

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## OFP-029

## Photon Buildup Factor Investigation Depending on the Sample Thickness for the Some Compounds

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**Objectives:** In this study, photon buildup factors were calculated for some chemical compounds in the different sample thickness using <sup>241</sup>Am energy sources. Variations of buildup factor with thickness were reviewed for different compounds.

**Design and methods:** The measurements have been made for  $\text{CaO}_2$ ,  $\text{MgCl}_2$ ,  $\text{NiCl}_2$ ,  $\text{V}_2\text{O}_3$  compounds and five different thicknesses in the range of 0.43 mm-3.95 mm in a narrow beam good geometry set-up by the Energy Dispersive X-ray fluorescence spectroscopy (EDXRF) system. The mass attenuation coefficients for compounds have been calculated by using WinXCom computer program.

**Results:** The photon advancing in the material is exposed to many scattering and the secondary radiations occur as a result of the scattering. With the increase of the thickness, the probability of multiple scattering increases. This is known as buildup factor. The measurement results showed us that the buildup factor increased with increasing thickness of the samples.

**Conclusions:** The results of this work can be useful to determine correctly the dose of radiation and shielding technology.

## 1. Introduction

A reduction occurs in the intensity of the x-ray or  $\gamma$ -ray which passes through any materials. The reason for this reduction in the intensity is absorption or scatter of photon by material. When the x-ray photon or  $\gamma$ -ray photon interacts with one of the electrode of absorbent element, scattering may occur. When a beam that consist of the x-ray or  $\gamma$ -ray reaches the substrate surface, beam forming photons are interacted by atoms of the material as  $I(E)=I_0(E).e^{-\mu t}$  the beam is absorbed, scattered or passed (El-Kateb *et al.*, 2000). When a parallel beam of monochromatic x-ray is passed through a material, the intensity of the beam passing from the material has a reduction. After a x-ray beam of intensity passed through a material of  $t$  thickness, the decrease in intensity is expressed as  $I=I_0.e^{-\mu t}$ . This is known Lambert's Law. Where,  $\mu$  is a linear absorption coefficient that is defined as absorption per unit thickness. Electromagnetic radiation penetrating into material interacts with nucleus, free electrons and electrons bound to atoms of material. These are defined as photoelectric, pair formation, Compton and coherent events. Probability of occurrence of these events depends on the photon energy. While photoelectric events occur from 0.001MeV to 0.5MeV, the scattering events are more effective from 0.1MeV to 0.5MeV. The pair formation events occur in starting 0.5MeV energy and in the high energy photons (Siegbahn, 1974). The mass attenuation coefficient ( $\mu/\rho$ ) which is a quantity independent of the intensity is a parameter that determines the reduction in material of the radiation. This parameter expresses possibility of interaction of the incident photons with the mass per unit area of material. On the other hand, the mass energy absorption coefficient as a result of interaction of the incident photon energy is a quantity of kinetic energy the transferred the charged particles in the atoms of matter. The mass energy absorption coefficient is an important parameter that is used to determining amount of absorbed dose in medical and health physics. The photon forwarding in the material exposes many scattering with increasing of the sample thickness and the secondary radiations occur as a result of the scattering. After interacting with the substance, the total number of photons will cause increase. The amounts of the total photons include both uncollided photons from the source and additive from collided and secondary photons. In general, the above-mentioned Lambert-Beer's law, while photons beam in  $I_0$  intensity passing an environment leave the environment,  $I$  intensity expression varies as exponential. This equality to adapt with the experimental measurements is required photon correction factor due to scattering from different angles. Thus the equation takes  $I(E)=B_0(E).e^{-\mu t}$  form. Here,  $B$  is photon Buildup factor and it's always  $B \geq 1$  (Babapour *et al.*, 2008). Also the photon buildup factor is defined as the ratio of the total amount of photons to uncollided photons from the source.

The photons buildup factor is an important correction factor that is required in the nuclear laboratories, in order to be protected from radiation in the field of health physics and to computation constituent in the reactor shielding design (Al-Baiti, 2009). The photons buildup factor may change by many parameters for example; propagation direction of the source photons, photon energy, resolution of the detector, source detector, position of the source detector, geometric configuration of the source detector and sample's thickness (Jones *et al.*, 1995). Block thickness is determined to decrease x-ray effects in the radiotherapy by using photons buildup factor. There are many studies in the literature related to the photons buildup factor for example in the different energies and thicknesses (El-Hosiny *et al.*, 1999; Shimizu, 2002; Shimizu *et al.*, 2004; Singh *et al.*, 2008; Overcamp, 2009; Kucuk, 2010), in the shielding technology (Shultis and Raw, 2005; Sureau and Chiron, 2005; Trontl *et al.*, 2007), in biological sample (Sidhu *et al.*, 2000; Singh *et al.*, 2002), in the chemical compounds (Barar, 1999; Turgut *et al.*, 2002; Turgut *et al.*, 2005; Singh *et al.*, 2009) and in low and high Z elements (Shimizu *et al.*, 2002; Shimizu, 2004).

The mass attenuation coefficient values were given in the energy ranging in from 1keV to 100GeV (Lide, 1996). These values may be obtained by helping a computer program called XCOM that is developed for the calculation of the mass attenuation coefficient of the compound or mixture and for any element in energy between 1keV to 100GeV (Berger and Hubbell, 1987-1999). Then this program was moved to the Windows environment thanks to a program called WinXCom that provides ease of converting to a predefined Microsoft Excel template which consist of the cross section and mass attenuation data (Gerward *et al.*, 2001).

In this study, the variation of the photon buildup factor was observed by varying the thickness of the compounds  $\text{CaO}_2$ ,  $\text{MgCl}_2$ ,  $\text{NiCl}_2$ ,  $\text{V}_2\text{O}_3$  by using radioactive source <sup>241</sup>Am. The photon buildup factor is given as the ratio of experimentally obtained values of  $I_{measured}$  intensity to theoretically found values of  $I_{measured}$  intensity. Buildup factor has shown an increase by increased sample thickness.



## 2. Method and Experimental Details

The systematic diagram of this study in the EDXRF system is shown in Fig. 1. The samples were irradiated by  $^{241}\text{Am}$  radioactive point source in 59.5 keV photons energy. Two collimators were used for the formation of a narrow beam of photons from the source. Also the surroundings of experimental geometry were covered with lead shield to prevent other directly, scattering or background radiation from the environment and source. The compounds used in the experiment were pressed in the pressure of 5 tons/cm<sup>2</sup> by a hydraulic press (Spex, Cat. B25). This process provides the formation of rather a flat surface and may be minimized errors resulting from uneven surfaces. Mass of the samples made into tablet was weighed by a scale with precision 10<sup>-5</sup>g. The measurements were obtained for each sample in five different thicknesses (range of 0.43 mm -3.95 mm) and during 1200 s in narrow beam geometry. To determine the thickness of each pellet were measured three times from different locations of the sample using a precision micrometer. Incident ( $I_0$ ) and transmitted beam intensity ( $I$ ) for each compound were measured by a Si (Li) detector. The detector used in the study has active area 12 mm<sup>2</sup>, thickness 3 mm, Be window thickness 25 μm and FWHM = 160 eV at 5.9 keV for Mn Kα line. The peak areas were calculated from the spectrum obtained for each measurement. Measurement was repeated three times for all samples. The spectrums were analyzed by using Microcal Origin 7.5 Demo Version software program with least-squares fit method.  $I_{\text{calculate}}$  and  $I_{\text{measured}}$  intensities of photons were determined for obtain of buildup factor. The value of  $I_{\text{calculate}}$  was obtained by using  $I_0$  (the original intensity of the beam), mass attenuation coefficient  $\mu/p$  (determined with the help of WinXCom) and  $t$  ( $\text{g}/\text{cm}^2$ ) (the mass per unit area) in Eq. (1). Then samples prepared into pellets in different thickness were placed in the experimental geometry. The values of  $I_{\text{measured}}$  for each sample were obtained. The peak areas of  $I_{\text{measured}}$  and  $I_0$  have been calculated from the spectrum obtained for each measurement. The ratio to  $I_{\text{calculate}}$  of  $I_{\text{measured}}$  gave us the buildup factor. The deviations occurring in some buildup value may be due to the uncertainties of the evaluation of peak area, pellets thickness and weight measurements and counting statistics.

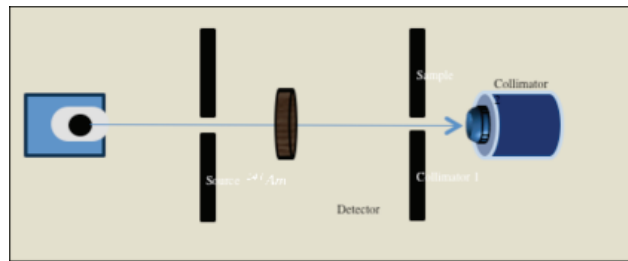


Fig. 1. Experimental set-up.

We have calculated effective atomic number of compounds both theoretically and experimentally by using the following logarithmic interpolation formula (Singh et al., 2007):

$$Z_{eff} = \frac{Z_1(\log \sigma_2 - \log \sigma) + Z_2(\log \sigma - \log \sigma_1)}{\log \sigma_2 - \log \sigma_1} \quad (2)$$

where  $\sigma_1$  and  $\sigma_2$  are the atomic cross-sections (barns/atom) in between which the atomic cross-section  $\sigma$  of the material lies and  $Z_1$  and  $Z_2$  are atomic numbers of the elements corresponding to the cross-sections  $\sigma_1$  and  $\sigma_2$ , respectively. And the total atomic cross-section can be obtained by dividing the mass attenuation coefficient  $\mu/p$  ( $\text{cm}^2/\text{g}$ ) of the compound by the total number of atoms present in one gram of that compound as follows:

$$\sigma_a = \frac{(\mu/p)_{\text{comp}}}{N_A \sum_i w_i / A_i} \text{ (barns/atom)} \quad (3)$$

where  $(\mu/p)_{\text{comp}}$  is the mass attenuation coefficient of the compound,  $N_A$  is the Avogadro constant,  $w_i$  is the fraction by weight of the element  $i$ , and  $A_i$  is the atomic weight of the  $i$ th element. The experimental and theoretical values of the total atomic cross-section,  $\sigma_a$ , of compounds have been used to determine the effective atomic number,  $Z_{eff}$ . Effective electron density of the compound can be obtained using following formula (Manohara et al., 2008):

$$N_{eff} = N_A \frac{n Z_{eff}}{\sum_i n_i A_i} = N_A \frac{Z_{eff}}{\langle A \rangle} \left( \frac{\text{electrons}}{\text{g}} \right) \quad (4)$$

where  $\langle A \rangle$  is the average atomic mass of materials,  $A$  and  $n_i$  is the number of atoms of the  $i$ th constituent element, respectively.

### 3. Results and discussion

In the present study, buildup factors of  $\text{CaO}_2$ ,  $\text{MgCl}_2$ ,  $\text{NiCl}_2$ ,  $\text{V}_3\text{O}_2$  irradiated by  $^{241}\text{Am}$  source have been determined according to variation of thickness of the compounds. The variation of the buildup factors with the thickness of the compounds for all compounds used in this study are shown Fig. 2. It can be seen from this figure that the variation of the buildup factors depend on the thickness of the compounds and the variations for all compounds is almost identical. In addition, from the results, it can be clearly seen that buildup factors increase with increasing thickness of the compounds. The photon advancing in the material is exposed to many scattering and the secondary radiations occur as a result of the scattering. With the increase of the thickness, the probability of multiple scattering increased. This multiple scattering caused an increase in the total number of photons.

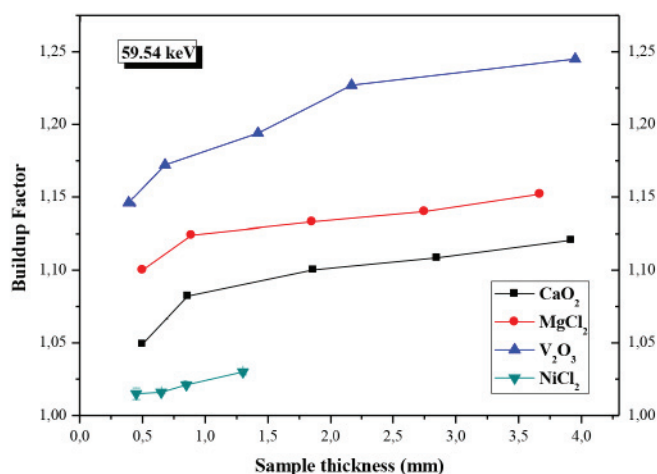


Fig. 2. Experimental set-up.

The experimental and theoretical values of effective atomic numbers and effective electron densities are tabulated in Table 1. It can be clearly seen that the variation in  $Z_{eff}$  depends on the range of atomic numbers of elements of which the compound is composed from the Table 1. The  $Z_{eff}$  values were found to increase with the presence of high Z elements in the compound. The effective electron density  $N_{eff}$  values for the present compounds were calculated using  $\langle A \rangle$  and  $Z_{eff}$  and given Table 1.  $N_{eff}$  is closely related to  $Z_{eff}$  and has the same qualitative energy dependence as  $Z_{eff}$ . Thus,  $N_{eff}$  values are proportional to  $Z_{eff}$  values for the present compounds in the same energy.

Table 1.  $Z_{eff}$  and  $N_{eff}$  values of compounds in 59.54 keV

Compound	$Z_{eff}^{Teo}$	$Z_{eff}^{Exp}$	$N_{eff}^{Teo}$	$N_{eff}^{Exp}$
$\text{CaO}_2$	15.009	12.892	1.825	1.568
$\text{MgCl}_2$	15.770	16.380	1.918	1.992
$\text{V}_2\text{O}_3$	18.129	17.362	2.205	2.112
$\text{NiCl}_2$	22.544	21.995	2.742	2.675

### 4. Conclusions

Buildup factors according to variation of thickness, effective atomic numbers and effective electron densities of  $\text{CaO}_2$ ,  $\text{MgCl}_2$ ,  $\text{NiCl}_2$ ,  $\text{V}_3\text{O}_2$  have been determined in 59.54 keV photon energy. It can be mentioned that buildup factor of compounds change with thickness linearly from results. The  $Z_{eff}$  and  $N_{eff}$  depend on high element of compounds. Also, the results of this work can be useful to determine correctly the dose of radiation and shielding technology.

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## PFP-001

## Measuring the Contagion Across Hedge Fund Industry

Bouker Sawsen<sup>a</sup>, Slim Skander<sup>a</sup><sup>a</sup>LaREMFiq Laboratory, IHEC, Sousse University, B.P. 40, Route de la ceinture, Sahloul 3, Sousse 4054, Tunisia**Abstract**

The aim of this research is to study the impact of financial crisis on hedge funds and to detect the presence of the effect of contagion in this industry. We choose a Markov Switching-Regime Regression model (MSR) to measure the dynamic risk exposures of hedge funds to different risk factors during different market volatility conditions. We perceive that hedge fund exposure depends on the equity market (S&P 500) is the up-state, which is characterized by both low volatility market and high returns or down-state, which is also characterized by both high volatility market and low returns. Furthermore, by exploring the possibility of all hedge fund strategies in high volatility regime simultaneously, we deem it as strong evidence of the presence of contagion among different hedge fund strategies. Based in our sample, the Long-Term Management (LTCM) crisis of August 1998 precipitated contagion across the hedge fund industry. These results were only generated by this crisis. Other crises including the recent subprime mortgage crisis of August 2007 and the recent global financial crisis of September 2008 have affected hedge funds and did not cause contagion among hedge funds.

**1. Introduction**

Since the mid-1990s, international financial markets have experienced various episodes of economic and financial distress. The major financial crises observed in recent years were located in different regions: from Mexico in December 1994, to Asia beginning in July 1997, Russia in August 1998, the USA (with the collapse of the U.S. hedge fund Long-Term Capital Management in September 1998 and the recent August 2007 subprime mortgage crisis), the Japanese in March 2001. The hedge fund industry has affected adjacent to these events. The regulators and risk managers were asked about the potential impact of opportunistic strategies of hedge funds on the international capital markets. Moreover, the number of hedge fund has seen a considerable increase. And the availability data of hedge funds data has attracted a lot of attention in academic literature. In our research, we study the effect of financial crises on hedge fund risk and we test the presence of contagion among hedge funds strategies during extreme events. Several empirical studies in the literature have focused on the hedge funds returns to examine the relationship between their returns and risk factors. Sharpe (1992) and Fung and Hsieh (1997) studied respectively mutual funds' performance and hedge funds dynamics. Their results indicate to significant nonlinear dependencies of hedge funds returns against to risk factors. The authors justify this nonlinearity by complexity of financial instruments and the dynamic strategies implemented by hedge funds to realize absolute returns: for example short selling, leverage, derivatives, illiquid assets... These instruments may to generate a complex and asymmetrical relationship between hedge fund returns and traditional assets. Furthermore, the reaction of hedge funds may also be time varying, claimed that the market in upturns or downturns. In this respect, we propose a factor model based on regime-switching in volatility, taking into account nonlinearity and dynamic hedge funds exposures to risks factors. Our approach is coherent with the time-varying market integration perspective proposed by Bekaert and Harvey (1995) and the work of Bollen and Whaley (2007) who show that allowing for switching in risk exposure is essential when analyzing hedge fund performance. The regime switching model enables us to measure hedge fund risk exposures in different market states: up-state, normal, and down state. This model allows us to capture the switch in volatility of the idiosyncratic risk factor. Also, this enables us to investigate the presence of contagion among hedge funds strategies. In our framework, we define contagion among hedge funds strategies when we observe that all hedge funds are in state of high volatility (down market). Our work is therefore to test the presence of contagion across the hedge fund industry using the Markov switching regime regression model. In our knowledge, we firstly introduce the Markov regime switching regression approach to can distinguish whether the distressed in the hedge fund industry is generated from the dynamic exposure to risk factors that are affected by financial crisis, from the contagion in the hedge fund industry, or both. The remainder of this paper is organized as follows. Section 2 presents our methodology and the econometric model. The data are described in section 3 and the estimation results are presented and discussed in section 4. Section 5 concludes.

**2. Methodology**

As mentioned in introduction, returns of hedge funds' strategies are widely known by their complexity and mostly by their dynamics on market over time. To estimate the dynamics of hedge funds returns and theirs exposures to risk factors, we shall begin firstly with determining the number of states taken into consideration. So, we shall characterize the S&P 500 behavior by a switching regime model. Then, we shall estimate our multi factor models.

*2.1 Presentation of model*

The capital asset pricing model (CAPM) and the arbitrage pricing theory (APT) remain to be popular asset pricing literature on both theoretical and empirical level. For this, we consider the following multi factor model applied to hedge fund returns:

$$R_t = \alpha + \beta I_t + \sum_{k=1}^K \theta_k F_{kt} + \omega \mu_t \quad (1)$$

Where  $R_t$  is the return of a hedge fund index in period  $t$ ,  $I_t$  is the market factor (in our example S&P500),  $F_{kt}$  is the return of  $k$ -th risk factor at time  $t$ , and  $\mu_t$  is IID. This model allows us to identify the exposure of hedge fund returns to risk factors  $I_t$  and  $F_{kt}$ . Hence, implying that relation between risk factors and returns must be linear. However, Fama and French argue that the failure of the CAPM in empirical tests implies that most applications of the model are invalid. Thus, we state an important assumption about the non linearity of several financial series, i.e., hedge funds returns are characterized by implementation of dynamic strategies. Our paper aims to analyze the relationship between hedge funds returns and risk factors in a non linear

framework. For this reason, we propose a more flexible model for capturing this behavior: regime switching model.

Formally, this model could be represented as:

$$R_t = \alpha(Z_t) + \beta(S_t)I_t + \sum_{k=1}^k \theta_k(S_t)F_{kt} + \omega(Z_t)\mu_t \quad (2)$$

$$I_t = \mu(S_t) + \psi(S_t)\epsilon_t \quad (3)$$

Where  $S_t$  and  $Z_t$  are the Markov chains with  $n_s$  and  $n_z$  states respectively and transition probability matrices  $P_s$  and  $P_z$  respectively. The state of the market index  $I_t$  is described by the Markov chain  $S_t$ . Each state of the market index has its own mean and variance. This means that if there are  $k$  states, there will be  $k$  values for  $\mu$  and  $\delta$ . If there is only one state of the world ( $S_t = 1$ ), formula (3) takes the Sharpe of  $I_t = \mu + \epsilon$  and it can be treated as a simple linear regression model under general conditions. The Markov chain  $Z_t$  characterizes the change in volatility of residuals. Hedge fund mean returns are related to the states of market index  $I_t$  and to the states of the volatility of residuals. In both cases  $\beta$  and  $\theta_k$  could be different conditional on a state of the risk factor  $I$ . Assuming now that the model in (2) has two states ( $k=2$ ). In addition to aiding intuition, using the two-regime case is a popular specification in applied work. If  $n_s = 2$  (states labels are denoted as 1 and 2),  $\beta$  and  $\theta_k$  depend on the state variable  $S_t$ .

$$\beta(S_t) = \begin{cases} \beta_1 & \text{if } S_t = 1 \\ \beta_2 & \text{if } S_t = 2 \end{cases} \quad (4)$$

And the matrix  $P_s$  will control the probabilities of making in switch from one state to the other. It can be represented as:

$$P_s = \begin{pmatrix} P_{11} & P_{12} \\ P_{21} & P_{22} \end{pmatrix} \quad (5)$$

With  $P_{12} = 1 - P_{11}$  and  $P_{22} = 1 - P_{21}$ , where  $P_{ij}$  controls the probability of a switch from state  $j$  to state  $i$ . In our example,  $P_{12}$  means that the probability of moving from state 2 to state 1. Likewise, the parameters  $P_{11}$  and  $P_{22}$  determine probabilities of staying in same regime. This model allows us to make dynamic forecasts. Despite the fact that the states  $S_t$  and  $Z_t$  are unobservable, but they can be statistically estimated (see for example Hamilton (1990, 1989)). Moreover, once parameters are estimated, the likelihood of regime changes can be easily obtained, as well as forecasts of  $\beta$  itself. Furthermore, the  $k$ -step transition matrix of a Markov chain  $S_t$  is given by  $P_s^k$ , the conditional probability of the regime  $S_{t+k}$  given date  $t$  data  $R_t = (R_t, R_{t-1}, \dots, R_1)$ . In our case when number of regime is 2 (regime 1 and 2), the conditional probability is given as:

$$P(S_{t+k} = 0 \mid R_t) = \pi_1 + (P_{00} - P_{11})^k [P(S_t = 0 \mid R_t) - \pi_1] \quad (6)$$

$$\pi_1 = \frac{(1 - P_{11})}{(2 - P_{00} - P_{11})} \quad (7)$$

Where  $P(S_t = 1 \mid R_t)$  is the probability that the date- $t$  regime is 0 given the historical data up to and including date  $t$ . more generally, the conditional probability of the regime  $S_{t+k}$  given date  $t$  data is:

$$P(S_{t+k} = 0 \mid R_t) = P_s^{k'} a_t \quad (8)$$

$$a_t = [P(S_t = 0 \mid R_t)P(S_t = 1 \mid R_t) \dots P(S_t = n \mid R_t)]' \quad (9)$$

In a similar way, the conditional probability of the Markov chain  $Z_{t+k}$ , that characterizes the switch in volatility of the innovations (residuals), given date  $t$  data for strategy  $i$ .

$$P(Z_{i,t+k} = 0 \mid R_{i,t}) = P_{n_z}^{k'} b_{i,t} \quad (10)$$

$$b_i = [P(Z_{i,t} = 0 \mid R_{i,t})P(Z_{i,t} = 1 \mid R_{i,t}) \dots P(Z_{i,t} = n_s \mid R_{i,t})]' \quad (11)$$

Therefore, our test of contagion is based on determination of the joint probability that all  $n$  hedge fund strategies are in high volatility of residuals. Thus, we define contagion among hedge fund strategies when we observe a significant change in the joint probability that all hedge funds are in the high volatility regime (down market).

### 2.2 Sample and Data

For the empirical analysis in this paper, our data consist hedge fund returns and risk factors. We consider 7 different hedge fund strategies that may be classified into three styles: directional, arbitrage and event driven styles. Arbitrage style managers are interested in exploiting price spreads between closely related assets. Directional or trading style managers seek to take benefit from a gamble on the overall direction market and involve taking positions on forwards and options markets, and on global market. While, event driven style tends to profit from events affecting companies such as mergers and restructuring. For Hedge Funds data, we use monthly hedge fund index return data from Hedge Funds Research (HFR) beginning with January 1994

up to November 2011. This database includes more than 18800 funds. The HFR indexes are equally weighted and net of fees. There are seven single strategies indices of different styles: Arbitrage style such as Fixed Income and Equity Market Neutral strategies and Directional style naming Emerging Market strategy, as well as Event Driven style such as Merger Arbitrage, Distressed Securities, Multi-Strategy and Event Driven.

Regarding risk factors, we consider three important variables (factors) that we wish to measure their impact on different hedge fund strategies. Therefore, we consider the stock, currency and volatility markets where hedge funds strategies are mainly exposed to these risk factors selected. Principally, these risk factors may portray all different strategies, and are represented by the following indexes: S&P500, TWEXB (Bank of England Trade Weighted Index) and VIX (CBOE Volatility Index). We introduce the VIX to depict strategies, where some funds take long positions in volatility. Overall, these variables are considered the main risk factors for hedge funds and are usually referred to in the literature. We use these factors to estimate risk models for the seven hedge funds indices. Summary descriptive statistics for the returns on monthly hedge funds strategies indices are statistic provide that hypothesis of normality of several hedge fund strategies is rejected. Therefore, the asymmetry, leptokurtic excess and non-normality are indicators of non-linearity that can be justified by the complexity of financial instruments and dynamic strategies used by hedge.

The correlation coefficients between the returns of hedge fund indices and those risk factors stock market, foreign exchange and volatility show that the returns of hedge funds seem to be highly correlated. Moreover, the correlation of S&P 500 with several hedge fund strategies at frequencies is lowest. The exception is the correlation with the Event Driven strategy, which a value is 0.5. Likewise, hedge fund strategies returns are weakly and negatively correlated with other risk factors (TWEXB and VIX). These results suggest a complex and specific relationships between different hedge fund strategies returns and risk factors returns.

2.3 Analyses and Results

2.3.1 Switching regime model of S&P 500

To determine the number of regimes used in the estimation, we estimate and test different models with different number of regimes. We decide that using two regimes is optimal for our analysis. Using two regimes is consistent with the literature that well recognizes the presence of upturns and downturns of the equity market. The results of estimation are presented in (table 1). The empirical estimates provide strong evidence that the equity market move in two states, where state 1 has relatively low monthly volatility of 0.0454%. We denote this regime as an up-market regime, which is persistent (The probability to remaining in this regime in the following month is 0.97). Regime 2, which is often associated with financial crisis, captures market downturns and has volatility of 0.4469%. This is also a persistent regime and the probability of remaining in it is 0.99. Using the Hamilton and filter and smoothing algorithms (Hamilton 1994) allows us to identify when the S&P 500 was in one of the two regimes for each date of the sample.

Based on the first part of the sample, we notice from January 1994 to December 1996(see figure 1), the S&P 500 returns are frequently characterized by the up-market. The period from 1997 to 2002, is characterized by down market regime. This can be mainly explained by high instability of the financial markets starting from Asian down-market in 1997, then the collapse of LTCM in 1998. Moreover, the Japanese down-market of March 2001, September 11, 2001 are captured mostly by regime 2. And the part of the sample from January 2003 through the first quarter of 2007 is characterized by an up market. Finally, starting August 2007, the S&P 500 returns are again in regime of down market, where market returns are affected by the subprime crisis (2007) and the current financial crisis 2008. Accordingly, the regime switching approach allows us to identify periods when the market return distribution belongs to large volatility periods characterized by return downturns. Thus, we may face positive or negative return. Our findings confirm that the null hypothesis of single regime is strongly rejected and that there is strong evidence of switching-regime on the U.S. stock market. Moreover, we distinguish that there are two regimes with a persistent low-volatility state (regime1) and a high volatility state (regime2), which is characterized by a major crisis in the stock market. In this respect, we estimate our switching regime regression model for each hedge fund strategy with endogenous risk factors, with a number of states is equal to 2.

Table1. Results of estimation

	Regime 1	Regime 2
<b>α</b>	0.0127 (0.00)	<b>0.0072</b> <b>(0.21)</b>
<b>Standard deviation (σ<sup>2</sup>)</b>	0.000454 (0.00)	0.004469 (0.00)
<b>Probabilities of being in same regime</b>	0.97 (0.00)	0.99 (0.00)
<b>log Likelihood</b>	<b>321.689</b>	
<b>Duration</b>	29.43	107.83

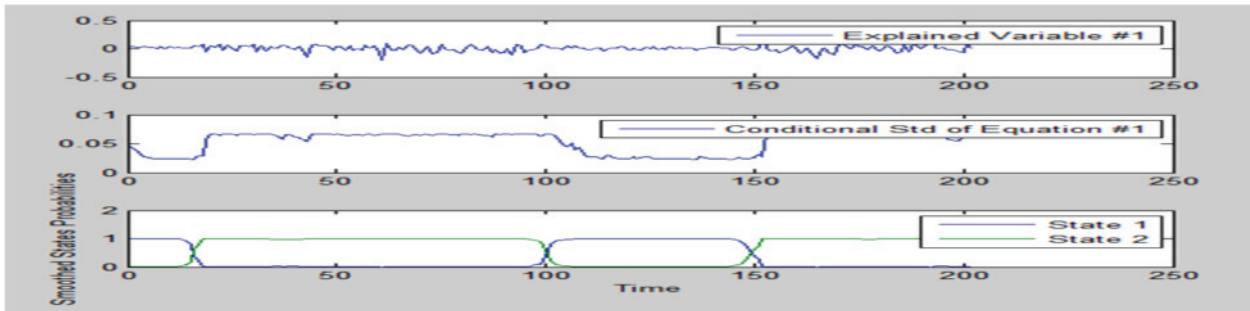


Fig (1): Transition of probabilities

2.3.2 Markov Switching-Regime Regression Model (MSR):

As discussed above, the graphical analysis of returns of different hedge fund strategies shows us that hedge funds have registered significant and important losses during periods of crisis and especially during the collapse of LTCM (in 1998), during the subprime and the recent financial crisis (in 2008). In this respect, our estimate of the multi factor model is done in two sub-periods: the first is ranging from 01/01/1994 to 31/12/2005 and the second is going from 01/01/2006 to 01/11/2011.

In this section, we estimate the multi-factor model for each hedge fund strategy using MSR approach and reported the main results in table 4. Using MSR allows us to analyze dynamics exposures of different hedge funds strategies to risk factors selected in different regimes (up and down market). We are considering nonlinear exposures to systemic risk factors: S&P500, VIX and TWEXB. For each factor, we estimate two exposures:  $\beta_{i,1}$  is a hedge fund exposure for a factor  $i$  when the S&P500 is in the up state and  $\beta_{i,2}$  is a hedge fund exposure for a factor  $i$  when the S&P500 is in down state. We estimate different factor loadings  $\beta_{i,j}$  relative to the S&P500 regimes for all hedge funds indexes. Firstly, we consider the coefficients relating to risk factor equity market. We find the exposures all strategies to the S&P 500 during crisis periods are lesser or negative compared with to tranquil periods. This suggests that hedge fund managers are capable to hedge market exposures, especially during financial crisis. For example, the exposure of hedge fund returns of Equity Market Neutral strategy to S&P500 during tranquil periods is 0.0095 and is reduced to 0.0025 during market down returns, as shown in ( Appendix 2). While, the exposures of the strategy are positive during down and up market conditions. These results confirm the hypothesis that the market neutral strategy can neutralize the effects of normal fluctuations of the market, but when the market is abruptly moving to another regime, so to hedge against these changes, the exposure becomes positive. Almost strategies have a positive market exposure both when the market is characterized by the down market state and up market state. The exposures of these strategies are significant and different from zero in at least one regime for both sub periods. The Event Driven strategy presents a negative exposure in the down market for both sub periods. These results are in line with the fact that the Event Driven strategy can be affected negatively by flight to quality episodes (episodes of significant declines as the example of the U.S. sovereign debt). Thus, we find that the risk factor of the stock market is a risk factor common for all different hedge fund strategies. However, other risk factors play a role as important as the S&P 500 to describe the dynamic hedge fund exposures. Secondly, we consider the exposures of hedge fund strategies to risk factor of the volatility VIX for two sub periods. Moreover, we find that another risk common factor for all hedge fund strategies is VIX. We note that all different strategies show a negative exposure to this variable in up market (state 1) for both sub periods. Whereas three out of seven strategies present a positive exposure to VIX in the down market during first period of this study. In fact, the coefficients  $\beta_2$  VIX of these strategies (Event Driven, Emerging Market and Equity Market Neutral) are a significant and positive where their  $\beta_2$  VIX are respectively as following (0.0504, 0.0349 and 0.0084). As expected, an increase of volatility during crisis periods is more probably to lead to hedge fund losses compared with up market time. When, higher volatility is associated with lower liquidity, higher correlations, higher credit spreads and flight to quality. Therefore, in the down-market the change in volatility negatively affects the returns for most strategies, and in up-market, all strategies register additional returns. For most of the strategies considered, exposures to the VIX have opposite signs in down and up markets for both sub periods. This implies that the different strategies of hedge funds take advantage of negative changes in market volatility. Finally, we consider a risk factor of change which is indexed by the index TWEXB. We find that the estimation results indicate that the most strategies of hedge fund have a negative exposure to this variable TWEXB for both regimes up and down markets. In fact, the coefficients  $\beta$  TWEXB associated to this risk factor are a significant and negative in up-market period. While, there are strategies act positively with price fluctuations in the currency exchange market. This implies that strategies are not affected same by simple variations on the market. Indeed, we find that this risk factor is not inherent factor for Merger Arbitrage, Fixed Income and Emerging Market strategies for first period. Contrariwise, for these strategies, the exposure to TWEXB is significant during the second sub period. In addition, Emerging Market, Multi strategy and Event Driven strategies take advantage of when the market knows drop episodes, which their coefficients of  $\beta_2$  are positive and significant ( respectively 0.8842, 0.8889 et 0.334). As also, hedge funds may to cover against this currency risk by tacking on forward contracts. In conclusion, we find convincing evidence that for different hedge funds strategies are affected by the various risk factors identified and their factor exposures are different for various factors conditional with state of the market.

Moreover, this model shows that factor exposures are dynamic which are changing conditional on the volatility of the market risk factor. Therefore, our initial hypothesis that the exposures to various risk factors are time-varying and are changing with conditional volatility of the market risk factor. It is important to confirm that most different hedge fund strategies are affected by extreme returns, especially financial crises. This leads us to our main objective of this study, the identification of the presence of contagion across hedge fund strategies in times of crisis. Indeed, we estimate the joint probability with the regime switching model for each hedge fund strategy. We note that the regime 1 (up-market) is more persistent than regime 2 (down market) for all identified strategies where the probability  $p_{11}$  (is probability of state in the same regime 1) is greater than  $p_{22}$  (is the probability of state in the same regime 2) for the two sub-periods. In addition, we estimate the volatility of model for each strategy. We perceive that volatility is characterized by two different regimes with high and low volatility for seven hedge fund strategies during the first study period. In fact, Emerging Market strategy

presents widest volatility ( $\sigma_2^2 = 0.201\%$ ). In contrast, for the second sub-period, the volatility of the model for four out seven strategies evolves in a one regime (up market). This means that these strategies have registered significant earnings during this period.

Monthly probabilities ( $p_{11}$  and  $p_{22}$ ) and volatilities ( $\sigma_1^2$  and  $\sigma_2^2$ ) of the different strategies during the period of this study from 01/01/1994 to 01/11/2011 are shown in the graphics (see Appendix1). We see that evolution of the volatility of different strategies of hedge funds is slightly different. We observe that all most different strategies are be in regime 1 which is characterized by low volatility than in regime 2 which is characterized by high volatility, especially during first sub period where is characterized by many times of crises. These graphs allow us to see the change in volatility, also as the switching from one regime to another. In particular, we observe that different strategies present a high probability of being in high volatility regime during periods of crisis from 1997 till 2001. This indicates that the exposure to the S&P 500 is changing, where the hedge funds indices can switch to the high volatility at the same time when the market is characterize by turbulence. This may be explained by contagion among hedge fund strategies. Thus, our aim is to prove that the evidence of existence of contagion across hedge fund industry.

– The collapse of LTCM 1998:

By concentrating on the first sub-period from 01/01/1994 to 31/12/2005, we are able to explore whether the volatility of hedge fund indices was high during the collapse of LTCM. We find that the probability of being in high volatility regime for all hedge fund strategies increased in August 1998, the month of the LTCM collapse. We also observe that the all hedge fund strategies without exception are in high volatility state (down market) as shown graphics (see Appendix 1). The results suggests that even after accounting for market and other factor exposures, the liquidity crisis precipitated by the collapse of LTCM was affected all hedge fund strategies. This proves strong evidence that the presence of contagion across hedge fund industry during one extreme event which is the LTCM failure.

– 2007 Subprime Mortgage Crisis and 2008 Financial Crisis:

The last part of the sample includes the most recent subprime mortgage crisis of August 2007 and the recent September 2008 global financial crisis. We then test the hypothesis that all different hedge fund strategies might be affected by these crises. We perform a similar analysis for this second sub period; calculating joint probabilities of different two states for all seven strategies. We find that the probability of being in high volatility regime for Distressed, Emerging Markets, Event driven and Equity Market Neutral is significant and different from zero. Therefore, these strategies were affected by crises, even after taking into account systemic risk exposure. However, Merger Arbitrage and Multi strategy had a zero probability of being in high volatility regime (down market) during the whole time period. Furthermore, the joint probability of a high volatility state for all hedge fund strategies is zero during the subprime mortgage crisis of August 2007 and the global financial crisis of September 2008. These crises affected separate hedge fund strategies but not hedge fund industry. This did not lead to contagion among all hedge fund strategies. We can explain that one by the increase in the systematic linkages during periods of crisis.

### 3. Conclusion:

This paper investigates the impact of financial crises on hedge fund industry. We analyze risk exposures for different hedge fund strategies, especially in the down state of the market characterized by a high volatility. We use the Switching regime regression model to characterize the dynamic exposure of hedge fund index to risk factors identified. This approach allows us to study time varying risk exposure for hedge funds in different state of the market. First, we find that the dynamics of hedge fund returns and their relationship with risk factors exhibit nonlinearity and asymmetry. This switching regime regression model (MSR) may to analyze the relationship between hedge fund returns and risk factors selected. Second, we find that the relationship between hedge funds and risk factors varies regularly and depends on the regime: downturns, upturns and crisis, etc. This MSR model allows us to capture the evolution of hedge fund exposure to risk and to analyze hedge funds reaction in periods of financial crisis. Furthermore, our MSR model should be able to capture contagion across hedge fund industry. Our findings suggest that all the identified hedge funds strategies exhibit a high volatility regime only during extreme event which is the collapse of LTCM. We find that the joint probability of high volatility regime for all hedge funds is approximately 1, at the LTCM crash. This provides strong evidence that even after accounting for market and other factor exposures, the LTCM crisis generated contagion across the hedge fund industry, even though the market was characterized by other crisis in the sample considered. Finally, our study shows that crisis including the recent subprime mortgage crisis and the global financial crisis 2008 affected hedge funds but not lead to contagion among hedge funds.

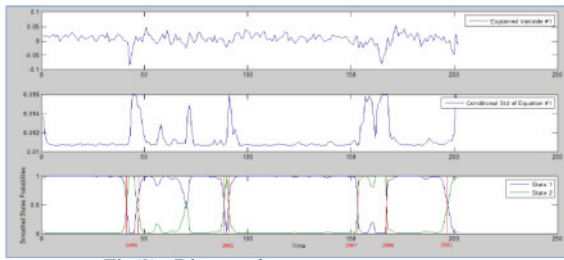
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Appendix 1:



Fig(2) : Distressed strategy

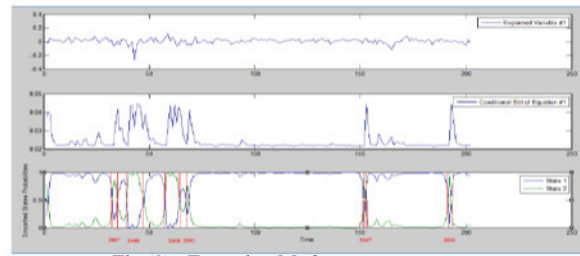


Fig (3) : Emerging Markets strategy

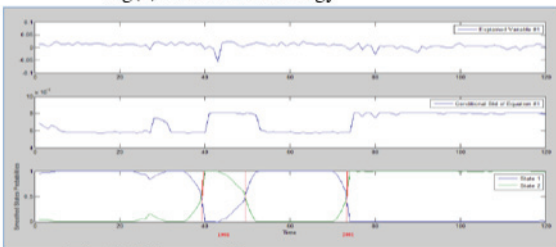


Fig (4): Merger Arbitrage strategy

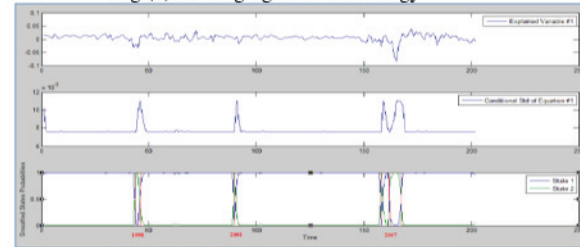
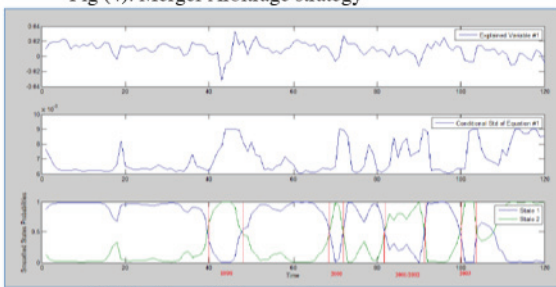
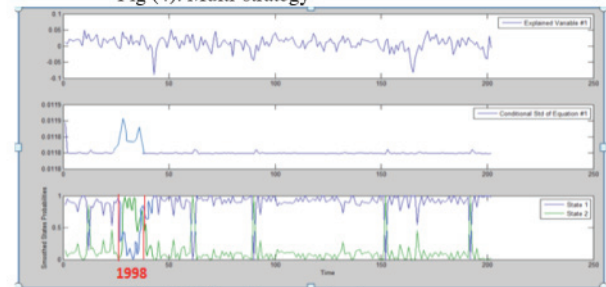


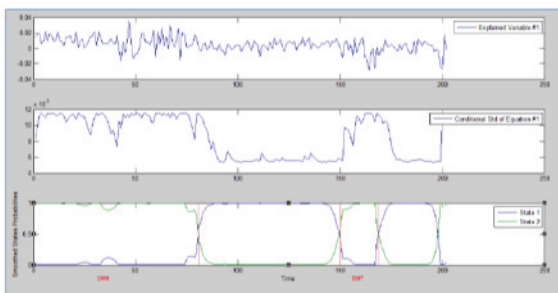
Fig (4): Multi-strategy



Fig(6) : Event Driven strategy



Fig(7): Fixed Income strategy



Fig(8): Equity Market Neutral strategy

Appendix 2: Table (2): Multi-factor model

	Index	Distressed	Merger Arbitrage	Multi Strategy	Event Driven	Emerging Markets	Fixed Income	Equity Market Neutral
First period from 01/01/1994 to 31/12/2004	$\alpha_1$	0.0.121 (0.00)	0.0133 (0.00)	0.008 (0.00)	0.0088 (0.00)	0.0086 (0.01)	0.013 (0.00)	0.00103 (0.00)
	$\alpha_2$	-0.0034 (0.74)	0.002 (0.00)	0.001 (0.73)	0.0007 (0.00)	-0.0064 (1)	0.0016 (0.48)	0.0025 (0.00)
	$\beta_{1(SP500)}$	0.3455 (0.01)	-0.0087 (0.59)	0.0733 (0.00)	0.1914 (0.00)	0.3384 (0.00)	0.51 (0.51)	0.0095 (0.00)
	$\beta_{2(SP500)}$	0.0865 (0.045)	0.1599 (0.00)	-0.0057 (0.89)	-0.186 (0.00)	-0.3065 (1)	0.1044 (0.00)	0.0025 (0.00)
	$\beta_{1(TWEXB)}$	-0.3157 (0.00)	0.0078 (0.91)	-0.0969 (0.02)	-0.2632 (0.01)	-0.2821 (0.21)	-0.0098 (0.88)	-0.0179 (0.00)
	$\beta_{2(TWEXB)}$	0.5523 (0.46)	-0.125 (0.15)	0.4067 (0.12)	0.2738 (0.00)	0.4751 (1)	0.0107 (0.93)	-0.1397 (0.00)
	$\beta_{1(VIX)}$	-0.0232 (0.01)	-0.0048 (0.00)	-0.004 (0.00)	-0.0548 (0.00)	-0.108 (0.00)	-0.0089 (0.00)	-0.0041 (0.00)
	$\beta_{2(VIX)}$	-0.0373 (0.17)	-0.0061 (0.00)	-0.0562 (0.00)	0.0504 (0.00)	0.0349 (0.00)	-0.0074 (0.00)	0.0084 (0.00)
	<b>Log-likelihood</b>	355.753	415.754	425	368.09	296.31	407.12	405.52
	$\sigma^2_1$	0.000094 (0.00)	0.000032 (0.00)	0.000024 (0.00)	0.000172 (0.00)	0.001 (0.00)	0.000033 (0.00)	0.00001 (0.00)
	$\sigma^2_2$	0.000831 (0.09)	0.000067 (0.00)	0.000152 (0.00)	0.00183 (0.00)	0.002 (0.00)	0.000093 (0.00)	0.00025 (0.00)
	$P_{11}$	0.94	0.96	0.96	0.94	0.97	0.91	0.99
	$P_{22}$	0.54	0.98	0.86	0.26	0.5	0.85	0.99

Second period from 01/01/2006 to 31/11/2011	$\alpha_1$	0.0107 (0.00)	0.0049 (0.00)	0.0043 (0.00)	0.0042 (0.00)	0.0052 (0.00)	0.0064 (0.02)	0.0032 (0.00)
	$\alpha_2$	-0.0099 (0.02)	0.0032 (0.00)	-0.00192 (0.00)	0.0108 (0.00)	0.0056 (0.00)	-0.0055 (0.32)	-0.0035 (0.34)
	$\beta_{1(SP500)}$	0.0523 (0.1)	0.0443 (0.00)	0.042 (0.00)	0.0984 (0.00)	0.1269 (0.00)	0.024 (0.00)	0.00258 (0.1)
	$\beta_{2(SP500)}$	-0.005 (0.98)	0.0631 (0.00)	0.0258 (0.00)	-0.4112 (0.00)	0.1141 (0.00)	-0.1744 (0.31)	0.0377 (0.52)
	$\beta_{1(TWEXB)}$	-0.4054 (0.00)	-0.0556 (0.00)	-0.4259 (0.00)	-0.4126 (0.00)	-0.6336 (0.00)	-0.7275 (0.00)	-0.0324 (0.61)
	$\beta_{2(TWEXB)}$	-0.4027 (0.08)	-0.3112 (0.00)	0.8889 (0.00)	0.334 (0.00)	0.8842 (0.00)	0.4222 (0.5)	0.0037 (0.98)
	$\beta_1(VIX)$	-0.0489 (0.00)	-0.023 (0.00)	-0.0366 (0.00)	-0.0445 (0.00)	-0.0634 (0.00)	-0.0753 (0.00)	-0.01 (0.01)
	$\beta_2(VIX)$	-0.0408 (0.00)	-0.2179 (0.00)	-0.134 (0.00)	-0.0391 (0.00)	-0.2133 (0.00)	-0.0522 (0.00)	-0.009 (0.5)
	<b>Log-likelihood</b>	242.775	278.528	323.009	240.407	262.868	201.453	289.224
	$\sigma^2_1$	0.000089 (0.00)	0.00006 (0.00)	0.0001 (0.00)	0.000155 (0.00)	0.000344 (0.00)	0.000428 (0.00)	0.000024 (0.00)
	$\sigma^2_2$	0.0002 (0.01)	0.0004 (0.00)	0 (0.00)	0.004 (0.00)	0 (0.00)	0.000012 (0.48)	0.000157 (0.00)
	$P_{11}$	0.97	1	0.96	1	1	0.99	0.96
	$P_{22}$	0.97	0	0	0.06	0.71	0.79	0.97

PFP-002

## The Effects of Managerial and Corporate Applications on Employees by the Mediating Roles of Empowerment and Intrapreneurship

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### Abstract

Approaches such as participative management, learning organizations, total quality management, excellence in the business system, self-management and structural empowerment increase the importance of employees and intrapreneurship of the organization. Managers being participatory will also increase the employee empowerment, provide the workers who work within the organization the opportunity to reveal themselves, thus increase their self-competencies. Intrapreneurship concept is the involvement of the employees in the innovation activities of the organizations mentally. Intrapreneurs are empowered employees who have a tendency to be an entrepreneur in the institution and can activate their new ideas and methods in the organizations in order to increase the management performance. In this study, the aim is to identify the mediating effect of psychological empowerment on the relationship between managerial and perceived corporate support with intrapreneurship. To test the propositions, a field survey using questionnaires was conducted. A printed questionnaire was created to collect data associated with the variables in the research. A total of 461 questionnaires were collected from Istanbul.

### 1. Introduction

The changing ways of doing business and organizational development process, within the last 20 years, has been moving towards managing the intangible abstract assets more than physical resources, and must focus on managing the processes instead of concrete outputs. As a result of this approach, organizations have turned to the psychological areas of the employees and engaged in efforts to restructure these areas. The most important and critical resource of organizations in a rapidly changing environment of business, competition and entrepreneurship is the qualified, knowledgeable and competent man force (Drucker, 1986). Hence, organizations aim to strengthen their employees with a positive approach by infusing them with concepts such as autonomy, creativity, and flexibility and supporting them. Approaches such as learning organizations, the total quality management, excellence in the system and structural empowerment increase the importance of employees of the organization.

Managers and superiors being participatory will increase the organizational communication, provide the employees who work within the organization the opportunity to reveal themselves, thus increase their self-competencies. Democratic managers distribute authority instead of centralizing it. Since the decisions are made based on participation, they are not one-sided as in authoritarian managers; democratic managers consult in the participators and the followers. Managers and the group act as a social unit. Employees are informed of situations that concern them, and encouraged to express their ideas and recommendations (Newstrom and Davis, 1993: 227).

According to Edmund Phelps, winner of the 2006 Nobel Prize in economics, modern economic growth is an indirect result of human creativity and enlightened politics should be applied as feeding and improving this creativity. In that way also the satisfaction and motivation of the workers are increasing (Godley, 2014: 255). Skill variety, importance of the task, job description, royalty and feedback are the preliminary conditions for creativity about work (Anderson et al., 2014).

### 2. Literature Review

Intrapreneurship can be described as the involvement of the employees in the innovation activities of the firms mentally. Pinchot (1985) expresses the concept as the imagination which takes the responsibility to create innovation. Intrapreneurship depends on the existence of the innovative environment in the firms (Morris and Kurakto, 2002). Intrapreneurs are the employees who have a tendency to be an entrepreneur in the company and can activate their new ideas and methods in the companies in order to increase the management performance (Kirby, 2003).

In the study (Sijde et al., 2013) the perception of the conditions in the organization and intrapreneurial behaviour are measured. Results highlight that firm size is related with intrapreneurship; large companies tend to have more relative to smaller companies. If organizational conditions support intrapreneurship more, people feel more positive and score more about organizational conditions and intrapreneurship behaviour questions.

In the organizations, entrepreneurial spirit dimensions are passion, internal ecosystems, organizational climate, internal cooperation, organizational support, management support and availability of rewards and resources (Aned O and Alya O, 2013).

Through the corporate applications and information systems, the employees, who have been adequately informed of the institution's strategy, vision, mission, general performance, and other units' work, feel stronger and reach their individual and organizational objectives. Sharing information and increasing cooperation, employees with more authority and autonomy, mutual communication opportunities, eased down organizational learning processes, increasing quality of work life and the balance of work-private life with the employees switching to their own autonomy, the destruction of traditional walls, and the formation of the sharing and cooperation culture with have positive impacts on the employees.

Sigler and Pearson (2000), in their study, determined that an organizational climate that strengthens its employees has a significant effect on individual performance, so institutional support and positive interventions associated with the business appear to have improved performance (Cameron et al, 2004). For this reason, managerial and perceived corporate support as mentioned can be assumed to be effective on the psychological empowerment and employee intrapreneurship.

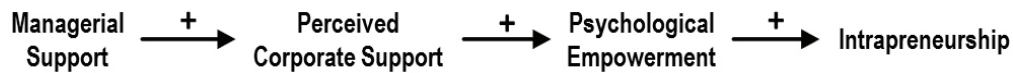


Fig. 1. Model of the research.

More specifically, the present study is designed to assess the effects of managerial and perceived corporate support on intrapreneurship through the mediation of psychological empowerment (Fig. 1). The following hypotheses are given to test the research model.

- H1.* Perceived corporate support will function as a mediating variable between managerial support and psychological empowerment.  
*H2.* Perceived corporate support will function as a mediating variable between managerial support and intrapreneurship.  
*H3.* Psychological empowerment will function as a mediating variable between perceived corporate support and intrapreneurship.

### 3. Methodology

#### 3.1. Research Goal

In this study, the researcher aims to identify the mediating effect of psychological empowerment on the relationship between managerial and perceived corporate support with intrapreneurship. To test the propositions, a field survey using questionnaires was conducted. The questionnaire is administered to participants who were currently employed.

#### 3.2. Sample and Data Collection

Adopting a survey methodology, data from a total of 461 participants were gathered through convenience sampling. A Likert type scale was presented to the respondents that would allow them to conduct evaluations regarding each entry. (1 = totally disagree, 5 = totally agree). Managerial support scale is adopted from Scarpello & Vandenberg (1987), Greenhaus et al. (1990) and Uslu et al. (2010). Perceived corporate support scale is adopted from Eisenberger et al. (1986) and Uslu et al. (2010). Within this study, proactivity items from Parker and Collins (2008) are translated for intrapreneurship scale. The items of psychological empowerment is taken from Spreitzer (1995). The Cronbach's Alpha values for each factors exceeds 0.80, which indicates the reliability of scales used in that survey. Data obtained from 461 participants were analyzed through the SPSS statistical packet program and proposed relations were tested through regression analyses. Mediation models were tested using the methodology proposed by Baron and Kenny (1986).

#### 3.3. Analyses and Results

Demographic characteristics of the sample used in this study are as follows: 46% of female respondents and 54% of males and the mean age was 41. Of 85% bachelor's degree and the remaining 15% portion of the participants were the elementary, middle school and high school graduates. The average working time in this workplace among the participants was approximately 10,5 years, and they have been in working life for an average of 18,5 years.

Factor structure of the scales and reliabilities were assessed, demographic analyses, difference tests, linear and hierarchical regression analyses were carried out using SPSS 18. Cronbach's alpha reliability coefficients of the scales were 0.80 and higher, therefore the scales were found to be reliable. For the purpose of determining the intermediation roles of the intermediary variables, three-step method proposed by Baron and Kenny (1986) was adapted to our research.

The models were compared by conducting a separate regression analysis for each model. Progressive intermediary variable tests towards the team performance are performed with verification of different models with SPSS (Table 1). Managerial support increase the perception of corporate support (model 1), psychological empowerment (model 2) and intrapreneurship (model 4). But perceived corporate support is more effective on psychological empowerment (model 3) and intrapreneurship (model 5). First and second hypotheses were fully supported. Psychological empowerment has the biggest positive effect on intrapreneurship (model 6), it is mediating between managerial support and intrapreneurship, third hypothesis was supported (Table 1).

Table 1. Impact of Managerial Support, Perceived Corporate Support and Psychological Empowerment on Intrapreneurship

	Dependent Variables					
	Perceived Corporate Support	Psychological Empowerment		Intrapreneurship		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Managerial Support	.818*** (.017)	.283*** (.027)	.052 (.057)	.369*** (.031)	.101 (.066)	.014 (.049)
Perceived Corporate Support			.283*** (.062)		.331*** (.072)	.143** (.054)
Psychological Empowerment						.817*** (.047)
<i>Adjusted R<sup>2</sup></i> <i>F</i>	.800 2327,745***	.208 108,591***	.245 67,311***	.274 137,701***	.312 83,071***	.628 204,633***

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$  significant value, standard errors in parentheses

#### 4. Conclusion

The results of the study indicates the effect of managerial and perceived corporate support on intrapreneurship through the mediation of psychological empowerment. It is apparent that a positive workplace directly supports employee entrepreneurship. Managers being participatory with the organizational system will increase the employee empowerment. Moreover, intrapreneurs in workplaces are empowered employees who can activate new ideas and methods in the organizations in order to increase the organizational performance. As a result of this approach, organization must be a nest for new ideas and innovations of the employees and engage in efforts to restructure these areas for employee intrapreneurship.

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## PFP-003

## Environmentally Desirable Synthesis of $\beta$ -Aryl- $\alpha$ -Thiolacrylic Acids by Cleavage of 5-Arylidene Rhodanine under Microwave Irradiation and Solvent Free

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### Abstract

Heterogeneous acid catalysts are of importance in the fine chemicals area, and several have been investigated in reactions such as the Knoevenagel reaction, an important reaction with pronounced solvent dependency. The condensation of active methylene compounds with gem-diacetates in the presence of acid aluminosilicates (montmorillonite KSF and K10) without solvent and under microwave irradiation, an efficient synthesis of arylidene compounds without isolation of aldehyde compounds. Cleavage of arylidene rhodanine derivative in position 5 in basic medium on potassium zirconium phosphate under microwave irradiation and free solvent is a simple and effective method for synthesis of  $\beta$ -aryl- $\alpha$ -thiolacrylic acids.

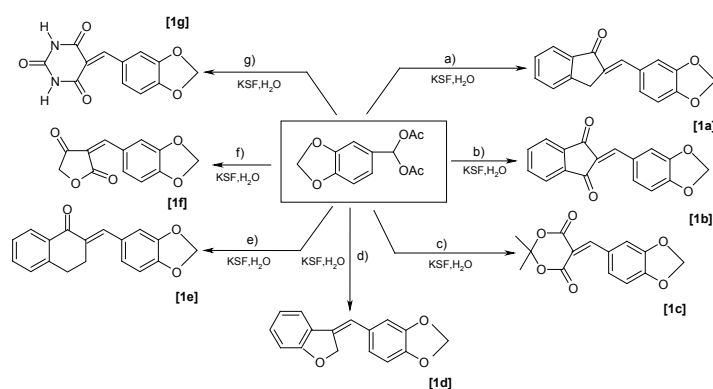
### 1. Introduction

Alkylidene and arylidene are found in many natural products and have interesting antibiotic properties, the most famous is albonoursin (Brown et al., 1965; Rao et al., 1960; Villemin et al., 1990), isolated from fungal cultures.

Besides their therapeutic properties (antiviral (Singh et al., 1981; Bhargav et al., 2013), antifungal (Singh et al., 1981), antitumor (Singh et al., 1981), sedative (Windholz (ed), 1983), anesthetic (Windholz (ed), 1983), hypnotic (Singh et al., 1981), analgesic (Windholz (ed), 1983), its arylidene derivatives (Reginato et al., 1999; Zhang et al., 2000; Sing et al., 2001), are an important intermediate synthetic of the heterocyclic compounds (Mustafa et al., 1959; Mustafa et al., 1965; Afsah et al., 1980) and the most convenient source of  $\beta$ -aryl  $\alpha$ -thioacrylic acids (Wheeler et al., 1903; Croxall et al., 1953; Mustafa et al., 1960). We reported herein that the condensation of active methylene compounds with benzylidene-1, 1-diacetates (acylals) catalyzed by clay Montmorillonite without solvent takes place rapidly under focused microwave irradiation. The use of heterogeneous acid catalysts allows a simplification of the purification step to a simple filtration separating the catalyst from the reaction media.

### 2. Results and Discussion

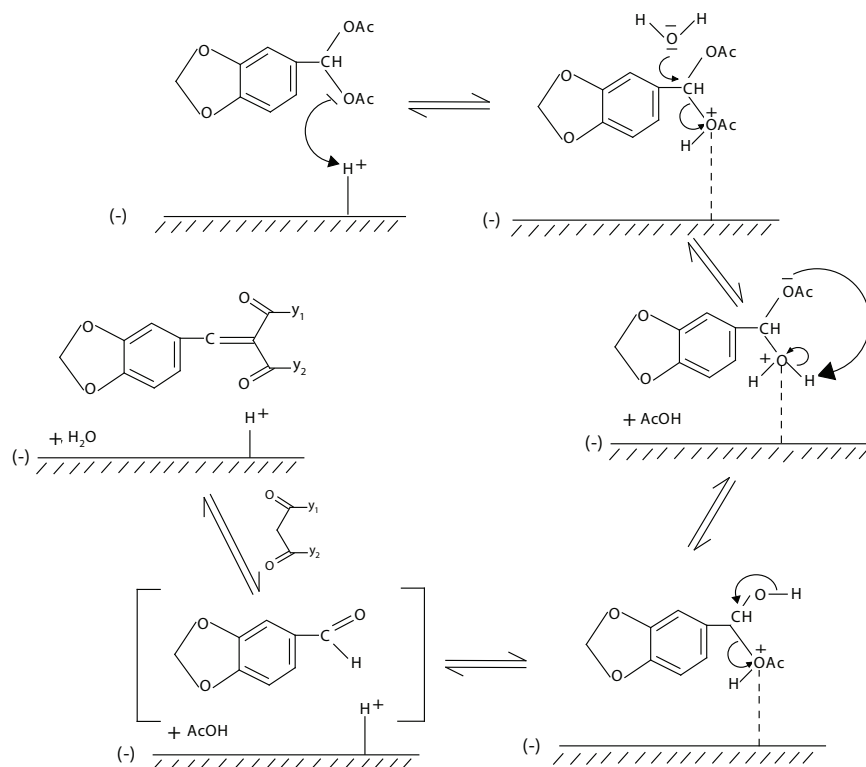
In our work, we mainly used the KSF with high acidity of Brønsted. Starting from the idea that the hydrolysis of esters during esterification reactions catalyzed by KSF clay under microwave irradiation has already been done by the authors, we hypothesized that water molecules intercalated in the Montmorillonite KSF, highly polar and strongly activated by microwave, were responsible for the hydrolysis reaction in situ of diacetates. We have prepared arylidenes compounds from 1,1-diacetate piperonyl methane (1), by reaction "one-pot" with compounds having an acidic methylene, under microwave irradiation. (Scheme-1)



Scheme 1. Condensation of 1,1-Diacetate piperonyl methane with active methylene acid catalyzed by KSF;  
 a) Indan-1-one; b) 1, 3-Indandione; c) Meldrum acid; d) 3-Coumarone;  
 e)  $\alpha$ -Tetralone; f) Tetronic Acid; g) Barbituric acid.




Gem diacetate is impregnated on Montmorillonite KSF by dissolution in methanol, followed by evaporation of the solvent in vacuo. A trace of water added to the solid mixture before irradiation. The reaction is rapid and reproducible. After three minutes of irradiation at 350 W in a simple microwave trading, the yield is 61%. The procedure is greatly simplified compared to heating at reflux with the use of sulfuric acid. We propose the following mechanism:



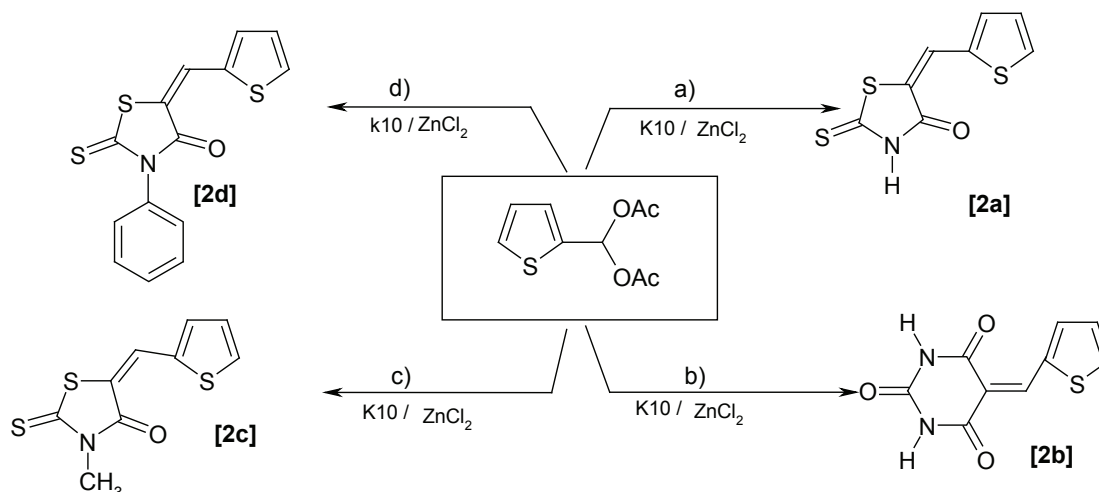
The reaction produces two molecules of acetic acid. Montmorillonite KSF is a Bronsted acid catalyst in condensation reactions with aldehydes.

The results of the condensation are reported in Table 1.

Table 1. Condensation of 1,1-diacetoxy-1-(3,4-methylenedioxyphenyl)methane [1] with methylene acid compound using microwave heating (KSF);

	Microwave		Product	Molecular formula	color	m.p	Yield (%)
	P(W)	t(mn)					
Indan-1-one	490	5	<b>1a</b>	C <sub>17</sub> H <sub>12</sub> O <sub>3</sub>	Yellow	177	50
1, 3 Indandione	420	8	<b>1b</b>	C <sub>17</sub> H <sub>10</sub> O <sub>4</sub>	Yellow	203	56
Meldrum acid	420	12	<b>1c</b>	C <sub>14</sub> H <sub>12</sub> O <sub>6</sub>	Yellow	176	59
3-Coumarone	520	4	<b>1d</b>	C <sub>16</sub> H <sub>10</sub> O <sub>4</sub>	Brown	178	57
α-Tetralone	520	2	<b>1e</b>	C <sub>18</sub> H <sub>14</sub> O <sub>3</sub>	Yellow	75	51
Tetronic Acid	420	3	<b>1f</b>	C <sub>12</sub> H <sub>8</sub> O <sub>5</sub>	Red	203	61
Barbituric acid	420	4	<b>1g</b>	C <sub>17</sub> H <sub>8</sub> O <sub>5</sub> N <sub>2</sub>	Red	262	62

Faced with average yields ranging from 50% to 61 % with clay protonated (Mont-H<sup>+</sup>), we thought of using a Lewis acid catalyst. Substituting the proton by the zinc cations in the K10, then obtained a Lewis acid catalyst (K10-ZnCl<sub>2</sub>) non hydrolysable, unlike the ZnCl<sub>2</sub> alone is very sensitive to water. These can form the pillars between the layers it is adapted better to catalyze the formation of the corresponding arylidenes from bis (diacetoxy) methylthiophene (2). The literature review of furfurylenes derivatives and thienylenes showed a less experienced. Their synthesis from the corresponding carbonyl compounds in acidic homogeneous medium is poorly reproducible. Our work was to find a replacement base for access to arylidenes compounds in the Knoevenagel reaction with active methylene compounds. The use of this new supported catalyst has allowed to condense in dry conditions under microwave activation a variety of active methylene compounds (Scheme -2)



Scheme 2. Condensation of bis(diacetoxy) methyl thiophene with active methylene acid catalyzed by K10/ZnCl<sub>2</sub>; a) Rhodanine; b) Barbituric acid; c) 3-Methyl rhodanine; d) 3-Phenyl rhodanine

The results obtained are shown in Table-2

Table 2: Condensation of Bis(diacetoxy)methyl thiophene [2] with active methylene compound (K10/ZnCl<sub>2</sub>)

		Microwave		Product	Molecular formula	color	m.p °C	Yield (%)
		P(W)	t(mn)					
		490	4	<b>2a</b>	C <sub>8</sub> H <sub>5</sub> NOS <sub>3</sub>	Orange	172	79
		490	4	<b>2b</b>	C <sub>9</sub> H <sub>6</sub> NO <sub>3</sub> S	Red	272	81
		490	5	<b>2c</b>	C <sub>9</sub> H <sub>7</sub> NOS <sub>3</sub>	Orange	171	84
		490	5	<b>2d</b>	C <sub>14</sub> H <sub>9</sub> NOS <sub>3</sub>	Orange	175	75

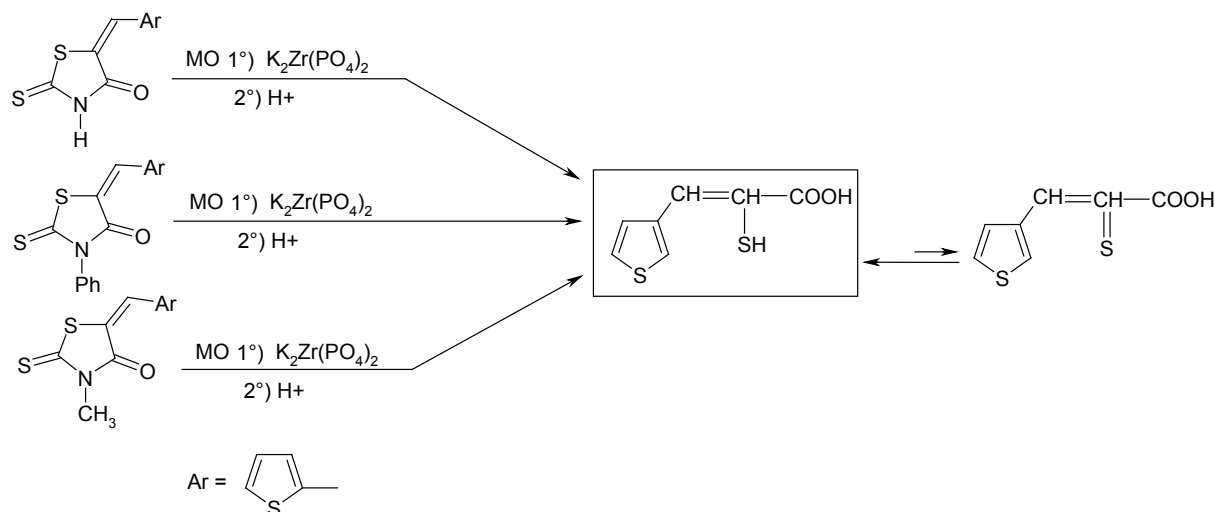
According to the results, we found that the doped solid acid catalysis better by zinc cations and under the same conditions training arylidenes with significant yield increases ranging from 75 % to 79 %.

#### Cleavage of 5-arylidene rhodanine compound:

Cleavage of arylidene rhodanine derivative in position 5 in basic medium on potassium zirconium phosphate under microwave irradiation and free solvent is a simple and effective method for synthesis of,  $\beta$ -aryl- $\alpha$ -thiolacrylic acids.

We were inspired by the literature that the cleavage takes place with heated alkali hydroxide, barium hydroxide at 100°C (Campaigne et al.,1956). After acidification derivative  $\beta$ -aryl- $\alpha$ -thiolacrylic acids were obtained.

We report herein the cleavage of 5-arylidene-2-thioxo-4-thiazolidinonbesy by potassium zirconium phosphate K<sub>2</sub>Zr(PO<sub>4</sub>)<sub>2</sub>. By activation under microwave irradiation (490 W, 4-5 min)(Scheme-3). Extraction with water and acidification gave  $\beta$ -thienyl- $\alpha$ -thiolacrylic acid with yield (93%). The  $\beta$ -thienyl- $\alpha$ -thiolacrylic acid can exist in two tautomeric forms:  $\beta$ -thienyl- $\alpha$ -thiolacrylic acids [form (A)] or as  $\beta$ -thienyl- $\alpha$ -thiopyruvic acids [form (B)]. Spectroscopic data and chemical properties are in favour of the predominance of form (A): In the 1H NMR spectrum no signal for the benzyl group appears and the resonance at 4.64 ppm was attributed to the SH.



Scheme 3. Cleavage of 5-arylidene rhodanine derived with potassium zirconium phosphate  $K_2Zr(PO_4)_2$

### 3. Experimental

Melting points (m.p) were determined with a Kofler hot apparatus and are uncorrected. Proton NMR spectra (PMR) were determined on Bruker AC 250 (250 MHz,  $CDCl_3$ ,  $Me_4Si$ ). Th.; TLC Analyses were performed by using Kieselgel Schleicher and Shull F 1500 Ls 254 and Merck 60F 254. The grinding of products were carried out on a analytical grinder A 10 of Janke and Kenkel-IKA Labortechnik. The Montmorillonite KSF and K10 was obtained from the firm of Süd Chemie. Degusa). The IR spectra were recorded as KBr pellets on JASCO FT/IR-4100 spectrometer UV-visible spectra ( $\lambda_{max}$  log ( $\epsilon$ )) were obtained with Spectrophotometer of UV-Force of T60U. Microwave irradiation were carried out with a commercial microwave oven (Whirlpool WMC10007AW) at 2450 MHz. and with resonance cavity TE013, joined to a generator MES 73-800 of microwaves. MES 73-800 of microwaves.

#### a) Preparation of Montmorillonite K10 Exchanged by $M^{++}$

**Procedure:** In a 250 ml flask, the Montmorillonite K10 (20g) was added to a solution of metallic salt  $ZnCl_2$  (0.2 mol) dissolved in 100ml of distilled water. The reaction mixture was stirred for 24 h at room temperature. The suspension was washed twice with distilled water then centrifuged. The Montmorillonite exchanged by  $Zn^{++}$ . Was washed with methanol and re-centrifuged. The solid was dried for 24 h in vacuum then finely ground. The final product was a clear beige colour.

#### b) Preparation of the 1, 1 diacetoxy-1-(3, 4-methylenedioxyphenyl) methane

**Procedure:** to a solution aromatic aldehyde (piperonal) (5 mmol) and freshly distilled acetic anhydride (5 mmol), montmorillonite KSF (3 g) was added at room temperature. The reaction mixture was magnetically stirred for 10 min. The resulting mixture was filtered. The filter cake was washed with  $CH_2Cl_2$  (10 ml). The organic phase was dried over  $MgSO_4$ , filtered and the solvent was evaporated to give the pure desired compound as a white crystalline compound.

White solid crystallised in ethanol ; m. p = 159°C (lit(Reginato et al.,1999; Zhang et al.,20004): 157 °C);  $C_{17}H_{12}O_6$ ; MM = 252.22 g. mol<sup>-1</sup>; Yield : 95 %; IR (KBr)  $cm^{-1}$  : 3080 ( $\nu$  C-H), 1772 ( $\nu$  C=O), 1602 ( $\nu$  C=C); 1257 ( $\nu$   $CH_3OC=O$ ); <sup>1</sup>H NMR ( $CDCl_3$ )  $\delta$ : 2.07 (s, 6H,  $CH_3$ ); 6.96 (s, 2H,  $OCH_2O$ ); 7.45 (d, 2H, ); 8.03 (s, 1H, CH=); **MS, m/z (%)**: 252 ( $M^+$ . 100).

#### c) Knoevenagel Condensation with gem diacetates in presence of solid acid

**General procedure:** The 1, 1 diacetoxy-1-(3, 4-methylenedioxyphenyl) methane (5 mmol) and the activated methylene compound (5 mmol) are mixed in the presence of montmorillonite KSF (5g) hydrated with a grinder for 2 minutes. The reaction mixture was placed in a 50 ml Erlenmeyer flask and then activated by irradiation with microwaves. After cooling of spent residue, dichloromethane (30 ml) is added to the vial to extract the solid acid by simple filtration through Celite. The solvent is evaporated under vacuum using a rotary evaporator. The product obtained was washed with ether to remove excess gem diacetate. After purification by distillation (Kugelhor), the solid obtained was identified by appropriate spectroscopic methods.

#### 1-Condensation of 1, 1-diacetoxy-1-(3, 4-methylenedioxyphenyl) methane [1] with methylene acid compound using microwave heating (KSF);

##### 2-(Benzo-1, 3-dioxol-5-yl) methylene)-2, 3-dihydroinden-1-one: (1a)

Prepared from diacetoxy-1-(3, 4-methylenedioxyphenyl)methane (5 mmol: 1.26 g) and indan-1-one (5 mmol: 0.66 g) in presence of KSF (5 g); Microwaves (P= 490 W, t = 5 min); Yellow Solid crystallised in ethanol ; m. p = 177 °C;  $C_{17}H_{12}O_3$ ; MM = 264.27 g. mol<sup>-1</sup>; Yield : 50 %; IR (KBr)  $cm^{-1}$  : 2998 ( $\nu$  C-H), 1710 ( $\nu$  C=O), 1612 ( $\nu$  C=C); <sup>1</sup>H NMR ( $CDCl_3$ ) $\delta$ : 4.01 (s, 2H,  $CH_2$ ); 6.05 (s, 2H,  $OCH_2O$ ); 6.92 (d, 1H,  $H_{2,ar}$ ); 7.21 (m, 2H  $H_{3,6,ar}$ ); 7.42 (m, 2H  $H_{4,ar}$ ); 7.58 (m, 2H  $H_{2,3,ar}$ ); 7.59 (s, 1H, CH); 7.90 (d, 1H,  $H_{4,ar}$ ); <sup>13</sup>C NMR ( $CDCl_3$ )  $\delta$ : 32.48 ( $CH_2$ ), 101.65 ( $OCH_2O$ ), 108.89 ( $C_6'$ ), 109.53( $C_3'$ ), 123.15 ( $C_2'$ ), 124.36 ( $C_3$ ), 126 ( $C_1$ ), 148. ( $C_6$ ), 149 ( $C_{5,4}$ ), 149 (C=O); **MS, m/z (%)**: 264 ( $M^+$ . 100); 265 (18.6); 266 (1.6).

*2-(Benzo-1,3-dioxol-5-yl)methylene)-2H-inden-1, 3-dione:* (1b)

Prepared from diacetoxy-1-(3, 4-methylenedioxyphenyl)methane (5 mmol: 1.26 g) and 1, 3- indandione (5 mmol: 0.73 g) in presence of KSF (5 g); Microwaves (P= 420 W, t = 08 min); Yellow Solid crystallised in ethanol; m. p = 203 °C;  $C_{17}H_{10}O_4$ ; MM = 278.26 g. mol<sup>-1</sup>; Yield : 56 %; **IR** (KBr)  $cm^{-1}$ : 2982 (ν C-H), 1682 (ν C=O), 1590 (ν C=C); **<sup>1</sup>H NMR** (CDCl<sub>3</sub>) δ: 6.19 (s, 2H, OCH<sub>2</sub>O); 6.95 (d, 1H, H<sub>2</sub>ar); 7.11 (m, 1H H<sub>2</sub>ar); 7.62 (m, 1H H<sub>6</sub>ar); 7.85 (m, 4H, H<sub>2,3,4,5</sub>ar); 7.99 (m, 2H, H<sub>4</sub>aro); 8.52 (s, 1H, CH); **<sup>13</sup>C NMR** (CDCl<sub>3</sub>) δ: 102.17 (OCH<sub>2</sub>O), 108.64 (C<sub>6</sub>), 112.86 (C<sub>3</sub>), 123.15 (C<sub>2</sub>), 126.84 (C<sub>1</sub>), 129.78 (C<sub>2,5</sub>), 133.00 (C<sub>4</sub>), 134.98 (C<sub>3</sub>); 135.18 (C=) 139.96 (C<sub>2</sub>) 142.43 (C<sub>1,6</sub>) 147.03 (C<sub>4</sub>) 148.24 (C<sub>5</sub>) 152.53 (CH); **MS, m/z (%)**: 278 (M<sup>+</sup>. 100); 279 (19. 07); 280 (2. 8).

*5-(Benzo-1,3-dioxol-5-yl)methylene)-2, 2-dimethyl-1, 3-dioxane-4,6-dione:* (1c)

Prepared from diacetoxy-1-(3, 4-methylenedioxyphenyl)methane (5 mmol: 1.26 g) and Meldrum Acid , (5 mmol: 0.72 g) in presence of KSF; Microwaves (P= 420 W, t = 12 min); Yellow Solid crystallised in ethanol; m. p = 17 °C;  $C_{14}H_{10}O_6$ ; MM = 274.22 g/mol; Yield : 59 %; **IR** (KBr)  $cm^{-1}$ : 2916 (ν C-H), 1748 (ν C=O), 1717 (ν C=O), 1588 (ν C=C); **<sup>1</sup>H NMR** (CDCl<sub>3</sub>)δ: 1.62 (m, 6H, 2 CH<sub>3</sub>); 6.19 (s, 2H, OCH<sub>2</sub>O); 7.12 (m, 1H, H<sub>2</sub> ar); 7.36 (m, 2H H<sub>4</sub>ar); 7.69 (s, 1H, CH); **<sup>13</sup>C NMR** (CDCl<sub>3</sub>) δ: 102.17 (OCH<sub>2</sub>O), 108.64 (C<sub>6</sub>), 112.86 (C<sub>3</sub>), 123.15 (C<sub>2</sub>), 126.84 (C<sub>1</sub>), 129.78 (C<sub>2,5</sub>), 133.00 (C<sub>4</sub>), 134.98 (C<sub>3</sub>); 135.18 (C=) 139.96 (C<sub>2</sub>); 142.43 (C<sub>1,6</sub>) 147.03 (C<sub>4</sub>) 148.24 (C<sub>5</sub>) 152.53 (CH); **MS, m/z (%)**: 276 (M<sup>+</sup>. 100); 277 (15.7); 278 (2.7).

*2-(Benzo-1,3-dioxol-5-yl)methylene)benzofuran-3 (2H)-one:* (1d)

Prepared from diacetoxy-1-(3, 4-methylenedioxyphenyl)methane (5 mmol: 1.26 g) and 3- coumarone , (5 mmol: 0.59 g) in presence of KSF (5 g); Microwaves (P= 520 W, t = 4 min); Brown Clear Solid crystallised in ethanol; m. p = 178 °C;  $C_{16}H_{12}O_4$ ; MM = 266.04 g. Mol<sup>-1</sup>; Yield : 57 %; **IR** (KBr)  $cm^{-1}$ : 2902 (ν C-H), 1750 (ν C=O), 1682 (ν C=O) 1596 (ν C=C); **<sup>1</sup>H NMR** (CDCl<sub>3</sub>)δ: 6.12 (s, 2H, OCH<sub>2</sub>O); 7.04 (d, 1H, H<sub>2</sub> ar); 7.12 (m, 3H, H<sub>3,5,7</sub>ar); 7.20 (m, 2H, H<sub>2,4</sub> ar); 7.42 (s, 1H, CH); 7.55 (m, 1H, H<sub>4</sub> ar); **<sup>13</sup>C NMR** (CDCl<sub>3</sub>) δ: 101.86 (OCH<sub>2</sub>O), 109.03 (C<sub>3</sub>), 111.25 (C<sub>2</sub>ar), 118.4 (C<sub>5</sub>), 122.01 (C<sub>2</sub>), 123.59 (C<sub>1</sub>), 125.60 (C<sub>3</sub>ar), 129.03 (C<sub>2</sub> ar); 130.62 (C<sub>1</sub> ar) 150.08 (C<sub>4'</sub>, 5' ar); 169.03 (C=O); **MS, m/z (%)**: 266 (M<sup>+</sup>. 100); 262 (19.7); 2268 (2.8).

*2-(Benzo-1,3-dioxol-5-yl)methylene)-3 4- dihydronaphtalen-1(2H)-one:* (1e)

Prepared from diacetoxy-1-(3, 4-methylenedioxyphenyl)methane (5 mmol: 1.26 g) and α-Tetralone , (5 mmol: 0.73 g) in presence of KSF (5 g); Microwaves (P= 520 W, t = 02 min); Yellow Solid crystallised in ethanol; m. p = 75 °C;  $C_{18}H_{14}O_3$ ; MM = 278.30 g/mol; Yield : 51 %; **IR** (KBr)  $cm^{-1}$ : 3060 (ν C-H), 2897 (ν CH<sub>2</sub>), 1680 (ν C=O), 1600 (ν C=C), 1230 (ν C-O-C); **<sup>1</sup>H NMR** (CDCl<sub>3</sub>) δ: 2.19 (m, 4H, CH<sub>2</sub>); 6.1 (s, 2H, OCH<sub>2</sub>O); 6.9 (m, 1H, H<sub>3</sub> ar); 7.30 (m, 2H, H<sub>1</sub> ar); 7.4 (m, 2H, H<sub>2</sub> ar); 7.47 (m, 1H, H<sub>3</sub> ar); 7.7 (s, 1H, CH); 8 (m, 1H, H<sub>4</sub> ar); **<sup>13</sup>C NMR** (CDCl<sub>3</sub>) δ: 26.8 (CH<sub>2</sub>), 39.3 (CH<sub>2</sub>), 101.7 (OCH<sub>2</sub>O), 106.8 (C<sub>2</sub>), 110.5 (C<sub>4</sub>), 124.8 (C<sub>1</sub>), 133.6 (C<sub>4</sub>), 137 (C<sub>5</sub>), 144 (C<sub>6</sub>); 148.6 (C<sub>4</sub>); 188 (C=O); **MS, m/z (%)**: 278 (M<sup>+</sup>. 100); 279 (19.8); 280 (2.8).

*3-(3, 4-(methylenedioxy)phenylmethylene)-2, 4-(3H, 5H)furanedione:* (1f)

Prepared from 1, 1 diacetoxy-1-(3, 4-methylenedioxyphenyl)methane (5 mmol, 1.26 g) and Tetrionic acid [2, 4-(3H, 5H)furanedione] (5 mmol, 0.5 g) in presence of KSF (5 g); Microwaves (P= 420 W, t = 3 min); Red Solid crystallised in ethanol; m. p = 203°C;  $C_{12}H_8O_5$ ; MM = 232, 18 g. mol<sup>-1</sup>; Yield : 61 %; **UV-Visible** λ max log (ε) (EtOH) nm: 402 (3.99); 282 (3.75); 252 (3.70); **IR** (KBr)  $cm^{-1}$ : 3010 (ν C-H), 1751 (ν C=O), 1690 (ν C=O), 1602 (ν C=C); **<sup>1</sup>H NMR** (CDCl<sub>3</sub>) δ: 4.65 (s, 2H, CH<sub>2</sub>); 6.20 (s, 2H, OCH<sub>2</sub>O); 7.13 (d, 1H, H<sub>3</sub> ar); 7.8 (t, 1H, H<sub>6</sub> ar); 8.03 (s, 1H, CH=) 8.52 (m, 1H, H<sub>2</sub>); **MS, m/z (%)**: 232 (M<sup>+</sup>. 100); 233 (18. 7); 234 (2. 4).

*5-((3,4-methylenedioxyphenyl)methylene)-2,4,6-(1H,3H, 5H)pyrimidinetrione:* (1g):

Prepared diacetoxy-1-(3, 4-methylenedioxyphenyl)methane (5 mmol: 1.26 g) and barbituric acid [2,4,6(1H,3H,5H)-Pyrimidinetrione] (5 mmol, 0.64 g) in presence of KSF (5 g); Microwaves (P= 420 W, t = 4 min); Red Solid crystallised in ethanol; m. p = 262 °C  $C_{12}H_8O_5N_2$ ; MM = 260, 20 g. Mol<sup>-1</sup>; Yield : 62%; **UV-Visible** λ max log (ε) (EtOH) nm: 382 (3.99), 254 (4.08), 386 (3.90); **IR** (KBr)  $cm^{-1}$ : 3532-3463 (ν NH); 1739 (ν C=O), 1686 (ν NHCONH) 1667 (ν C=O), 1559 (ν C=C); **<sup>1</sup>H NMR** (CDCl<sub>3</sub>)δ: 6.23 (1s, 2H, OCH<sub>2</sub>O); 7.2 (d, 1H, H ar); 7.9 (d, 1H, H ar); 8.3 (m, 2 H, H ar); 8.42 (s, 1H, CH=); 11.25 (s, 1H, NH); 11.4 (s, 1H, NH);

*2-Condensation of Bis(diacetoxy)methylthiophene [2] with active methylene compound (K10/ZnCl<sub>2</sub>)**5-(2-thienylmethylene)-2-thioxo-4-thiazolidinone:* (2a)

Prepared from bis(diacetoxy)methylthiophene (5 mmol: 1.07 g) and Rhodanine [ 2-Thioxo-4-thiazolidinone] (5 mmol, 1.67 g) in presence of K10/ ZnCl<sub>2</sub> (5 g); Microwaves (P= 490 W, t = 5 min); Orange Solid crystallised in ethanol; m. p = 172 °C;  $C_9H_7NOS_3$ ; MM = 227.326 g. mol<sup>-1</sup>; Yield : 79 %; **UV-Visible** λ max log (ε) (EtOH) nm: 257 (3.75), 291 (4.16), 401 (4.64); **IR** (KBr)  $cm^{-1}$ : 1698 (ν C=O), 1615 (ν C=C). **NMR <sup>1</sup>H** (CDCl<sub>3</sub>).δ: 7.15 (m, 1H, H arom); 7.35 (d, 1H, H arom); 7.66 (d, 1H, H arom); 7.87 (s, 1H, CH=C); 11.50 (s, 1H, NH).

*5-(2-thienylmethylene)-2,4,6-(1H,3H,5H)pyrimidinetrione:* (2b)

Prepared from bis(diacetoxy)methylthiophene (15 mmol: 3.21 g) and barbituric acid [2,4,6(1H,3H,5H)-Pyrimidinetrione] (15 mmol, 1.92 g) in presence of K10/ZnCl<sub>2</sub> (5 g); Microwave (P= 220 W, t = 5 min); Red Solid crystallised in ethanol ; m.p = 272;  $C_9H_6N_2O_3S$ ; MM = 222.22 g/mol; Yield : 81%; **UV-Visible** λ max log (ε) (EtOH) nm: 254 (3.84), 259 (3.79); 379 (3.98); **IR** (KBr)  $cm^{-1}$ : 3525-3575 (ν NH), 1752 (ν C=O), 1693 (ν NHCONH) 1649 (ν C=O), 1553 (ν C=C). **<sup>1</sup>H NMR** (CDCl<sub>3</sub>).δ: 7.53 (m, 1H, H ar); 8.20 (m, 2H, H ar); 8.55 (s, 1H, CH=); 11.32 (s, 1H, NH);

*5-(2-thienylmethylene)-3-methyl-2-thioxo-4-thiazolidinone (2c)*

Prepared from bis(diacetoxy) methylthiophene (5 mmol: 1.07 g) and 3-methylrhodanine (5 mmol, 0.73 g) in presence of K10/ZnCl<sub>2</sub> (5 g); Orange solid crystallised in ethanol; Microwave (P= 350W, t= 4mn); m.p = 171°C (lit(Brown et al., 1951):170);  $C_9H_7NOS_3$ ; MM=241.35 ; Yield : 84 %; **UV-Visible** λ max log (ε) (EtOH) nm: 254 (3.72), 288 (4.10), 395 (4.60); **IR** (KBr)  $cm^{-1}$ : 1700 (ν C=O), 1620 (ν C=C); **<sup>1</sup>H NMR** (CDCl<sub>3</sub>). δ: 3.45 (s, 3H, CH<sub>3</sub>-N), 7.10 (m, 1H, H arom), 7.30 (d, 1H, H arom), 7.60 (d, 1H, H arom) ,7.80 (s, 1H, CH=C).

*3. Cleavage of 5-arylidene rhodanine with potassium zirconium phosphate*

**General procedure.** Potassium zirconium phosphate (3g) is added to a solution of 5-arylidene rhodanine (5 mmol) in methylene chloride. After evaporation of the solvent under vacuum, the solid is irradiated with microwaves (490 W, 4-5 mn). Water (15 ml) was added and filtered. The filtrate was acidified to pH = 2 with hydrochloric acid and the β-thienyl-α-thiolacrylic acid was isolated by filtration. The acid is crystallized in ethanol.

*β-thienyl-α-thiolacrylic acid:*

Yellow solid crystallised in ethanol; Microwave (P= 280 W, t = 4 min); m.p = 116°C;  $C_7H_7O_2S$ ; MM = 155.19 g/mol; Yield : 93%; **UV-Visible** λ

max log ( $\epsilon$ ) (EtOH) nm: 232 (3.65). 251 (3.53). 261 (3.52). 268 (3.52). 337 (4.09) ; IR (KBr)  $\text{cm}^{-1}$  : 2580, 2638 ( $\nu$  SH), 1672 ( $\nu$ C=O), 1595 ( $\nu$ C=C); NMR  $^1\text{H}$  : 4.64 (s, 1H, SH) , 7.00-7.59 (m, 3H, H arom) , 8.11 (s, 1H, CH) , 8.72 (m. 1H,  $\text{CO}_2\text{H}$ )

#### 4. Conclusion

A general method was designed for the one pot synthesis of arylidenes compounds from gem diacetates whit acidic methylene a study on Knoevenagel reaction under acid heterogeneous conditions without solvent and under microwave irradiation. This method, using montmorillonite KSF (Brønsted acid) and doped montmorillonite by Zinc (Lewis acid) is very efficient and much more rapid than classical methods. Compounds with potential synthetic and biological interest are synthesized.

These compounds can be cleaved with potassium zirconium phosphate into  $\beta$ -thienyl- $\alpha$ -thiolacrylic acids in quasiquantitative yields, which is a reaction intermediate for the synthesis of many reaction compounds (amino acid, nitriles acid, and amines)

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## PFP-004

## Synthesis, Antibacterial and Antifungal Evaluations, Theoretical Study and Structure-Activity Relation of Novel Quinoxaline Derivatives

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### Abstract

In the present work, the structural and electronic properties of 2-hydroxyquinoxaline and all of its possible tautomer's have been investigated by the application of MM2, MMFF94, AM1 and PM3 type quantum chemical calculations. According to the results of the calculations, tautomer's B-B' have been found to be the most stable one among all the structures. The calculated density of partial charges by extended Hückel method shows that the O- and N-alkylation are due to the different values of O and N atom's charges. Some important geometrical properties and the calculated IR and NMR spectra of the systems have also been reported in the study. The data obtained for are in a good agreement with experimental foundations. Also, the biological evaluation was carried out by antibacterial and antifungal tests using different gram(+) and gram(-) bacterial strains (*Salmonella*, *K. P.*, *Staphylococcus*, *Bacillus*, *Pseudomonas*, *Enterobacter*, *E. coli*, *Proteus*), and two *Aspergillus* fungal. The structure-activity relationship of the evaluated compounds is also investigated.

### 1. Introduction

The tautomeric of organic compounds has been the subject of extensive theoretical studies using various quantum-mechanical and statistical-physical approach (Martiskainen, 2009). The importance of understanding the nature of tautomeric equilibria has long been recognized for the study of the processes of both organic chemistry and biochemistry (Kang et al, 2009). A lot of pharmaceutically active molecules, for example those containing 4-, 5- or 6-membered heterocyclic rings, are capable of existing as two or more tautomeric (prototropic) structures (Oae, 1990). This is why it is worth to study, understand, and predict possible tautomeric equilibria of vital molecules (Taylor et al, 2004). The 2-hydroxyquinoxaline molecule (quinoxalin-2-ol, C<sub>8</sub>H<sub>7</sub>NO, 2-HQ) has a wide variety of applications. In medicine, 2-HQ (Fig.1.) and its derivatives are used as antimicrobial anticancer, anti-inflammatory agents (Campbell, 2008; Gao, et al, 2003, Abu-Hashem et al, 2010). Whereas in agriculture they serve as fungicides and insecticides (Bergkvist et al, 1997; Riediger, 2006). 2HQ is also used, for the formation of conductor's polymers and chemical intermediate in dye synthesis (Turac et al, 2011). 2-Hydroxyquinoline (2-HQ) is known to exist in several tautomeric forms, which are nearly equal in energy and interconvert by simple hydrogen atom transfer between the OH group and the ring nitrogen (Su et al, 1984). A large number of works has been reported in the literature dealing with theoretical and experimental analysis of 2-hydroxyquinoxaline derivatives (Nilufer, 2004; Dahbi, 2010). Several experiments have been performed to evaluate relative stabilities of some of azaheterocyclic tautomers as compared with its solid, liquid, and gaseous phases. Gas-phase calorimetric measurements of 2-hydroxyquinoline shows that the keto form is more stable than the enol by 0.3 kcal/mole. In water, the enol form is thought to be more stable by about 5 kcal/mole (Chari, 2010; Mehata, 2005). Theoretical studies give us more information about the stabilities of the tautomers. In the work of S. Yurdakul and co-workers (Yurdakul et al, 2010). The stabilities of 2-HQ and its five tautomers were comprehensively studied using MM2, MMFF94, AM1 and PM3 method, IR and Raman spectra to compare its vibrational values to detect any relation between calculated vibrational values. In this work, the calculations are effectuated to reach three aims. The first aim is to optimize stable tautomers of quinoxaline and their derivatives, the calculated data were compared with the experimental results (NMR and IR spectra). The second is to determine the regioselectivity of 2-HQ alkylation (O-, N-alkylation). The third is to determine the mechanism of the thionation and the nitration reactions of 2-HQ by means of the electrophilic aromatic substitution reaction. The details of computations and results are presented. Moreover, the synthesized compounds were evaluated for their antibacterial against Gram-Negative organisms such: *Salmonella*, *K.P.*, *Escherichia coli*, *Enterobacter*, *Stenotrophomonas*, *Morganella*; and Gram-positive organisms such as: *Staphylococcus*, *Bacillus* and *Proteus*. Also, the antifungal activity against the *Aspergillus flavus* and *Aspergillus niger* were carried. The structure-activity relationship of the evaluated compounds was investigated in order to find the effect of different, functional group quinoxaline derivatives to the different strains.

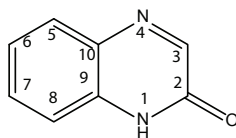


Fig.1. Structures of 2-hydroxyquinoxaline.

### 2. Computational method

The initial geometry optimizations of all the structures leading to energy minima were achieved by using MM2, MMFF94 method followed by semi-empirical PM3, AM1 method at the restricted level. The analysis of electron charge density has been calculated by using extended Huckel. The modeling packages used are: ChemBio3D Ultra (ChemBio3d Ultra, 2010) with Gamess interface (version 12). First using ChemBio3D Ultra for MM2, MMFF94, and the extended Huckel atomic charges; PM3, AM1, energies were obtained using the Gamess interface.

### 3. Experimental

#### 3.1. Samples Preparation

##### Compound 1

The initial geometry optimizations of all the structures leading to energy minima were achieved by using MM2, MMFF94 method followed by semi-empirical PM3, AM1 method at the restricted level. The analysis of electron charge density has been calculated by using extended Huckel. The modeling packages used are: ChemBio3D Ultra [20] with Gamess interface (version 12). First using ChemBio3D Ultra for MM2, MMFF94, and the extended Huckel atomic charges; PM3, AM1, energies were obtained using the Gamess interface.

##### Compound 2

In a round-bottomed flask, a mixture of 1 (5 mmol) and potassium carbonate (5 mmol) was dissolved in 15 ml of DMF at 80 °C under continuous stirring. Then, the alkyl halide (5 mmol) was dropwise added to the solution and heated at 80 °C for 6 h. The obtained product 2 was poured into the water. The precipitated was filtered and purified by recrystallization from ethanol (Makhloufi et al, 2011).

##### Compound 3

2-Hydroxyquinoxaline 1 (4 mmol) was added to a solution of phosphorus pentasulfide (4.5 mmol) in pyridine (30 ml) under vigorous stirring under reflux at 80 °C for 4 h. The precipitated product in water was filtered and purified by recrystallization from ethanol (Makhloufi et al, 2011).

##### Compound 4

A mixture of 2-quinoxalinethiol (3 mmol), alkyl halide (3 mmol), tetrabutylammoniumbromide (3 mmol) in toluene (30 ml), and 50% aqueous potassium hydroxide (15 ml) were refluxed at 110 °C for 24 h. The oily crude product was extracted from the dried organic layer and purified by column chromatography in ethyl acetate/methanol (7:3) system (Makhloufi et al, 2011).

##### Compound 5

Nitric acid (0.6 ml) was added dropwise to a solution of 2-hydroxyquinoxaline (5 mmol) in sulfuric acid (6 ml) with stirring at room temperature for 7 h. The crude product was precipitated in crushed ice, filtered, and purified by recrystallization in MeOH/water (Makhloufi et al, 2011).

##### Compound 6

In a round-bottomed flask, a mixture of 7-Nitroquinoxaline (5 mmol) and potassium carbonate (8 mmol) was dissolved in 15 ml of DMF at 80°C under continuous stirring. Then, the alkyl halide (5 mmol) was dropwise added to the solution and heated at 80 °C for 6 h. The obtained product 2 was poured into the water. The precipitated was filtered and purified by recrystallization from ethanol (Makhloufi et al, 2011).

#### 3.2. Physicals measurements

Different techniques are used for spectroscopic characterization. Infrared (IR) spectra were recorded on a Perkin-Elmer Spectrum 1000 spectrophotometer. NMR spectra were recorded on a Bruker Advance 200 spectrometer with tetramethylsilane (TMS) used as internal standard.

### 4. Results and discussion

#### 4.1. Energies and geometries

In this survey we aim to identify the mediating effect of learning orientation on the relationship between leadership style and firm performance. To test the propositions, a field survey using questionnaires was conducted. All tautomers of compounds A-F and A'-F', presented in Fig. 2, were considered in our study. The values of the calculated total energy of tautomer forms are collected in table 1. The results of MM2, MMFF94, PM3 and AM1 calculations show that compound B is the most stable of the majority of 2-hydroxyquinoxaline tautomers. The second minimum energy value possessed by the A form. Concerning the 2-thioquinoxaline tautomers reveals also that the B' and forms has the most basic energy. As well as, the stability order of the 2-hydroxyquinoxaline and 2-thioquinoxaline tautomers is as follows:

MM2: B > A > F > C > D > E, B' > A' > F' > C' > D' > E'. MMFF94: B > A > D > C > E > F, B' > D' > A' > C' > E' > F'.

PM3: B > A > C > D > F > E, A' > B' > C' > D' > F' > E'.

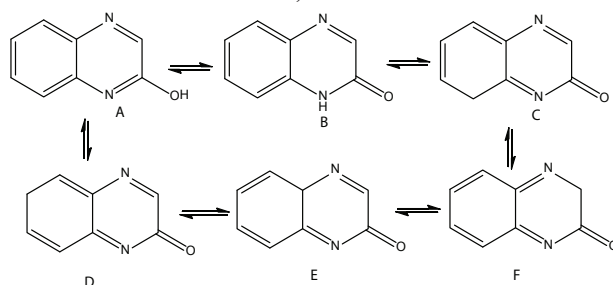


Fig. 2. Five possible isomeric structures of 2-hydroxyquinoxaline and 2-thioquinoxaline.

A comparison between the results obtained from different methods allowed us to find obvious discrepancies in relative energies of the tautomers at different level of theories. The results of Table 1 show that the AM1 calculation are not much different from each other, But reveals almost similar values for the A and B forms with 71.1233 71.2397 Kcal/Mol respectively. Concerning the PM3 method the results reveals that the A' is the most stable form

with 62.6955 Kcal/Mol, in comparison to B' has 72.0256 Kcal/Mol. The optimized structures of the studied molecules are shown in Fig. 3, the general geometries of molecules A-F and A'-F' are very similar. As for O and S which substituted to quinoxaline ring, we see that the MM2, MMFF94 geometry optimizations are planar structures for the (A, B, C, E, F-A', B', C', E') molecules and a non-planar structures in molecules (D, D'). The stability and planar structures of this tautomers may be attributed to the full conjugation of formers.

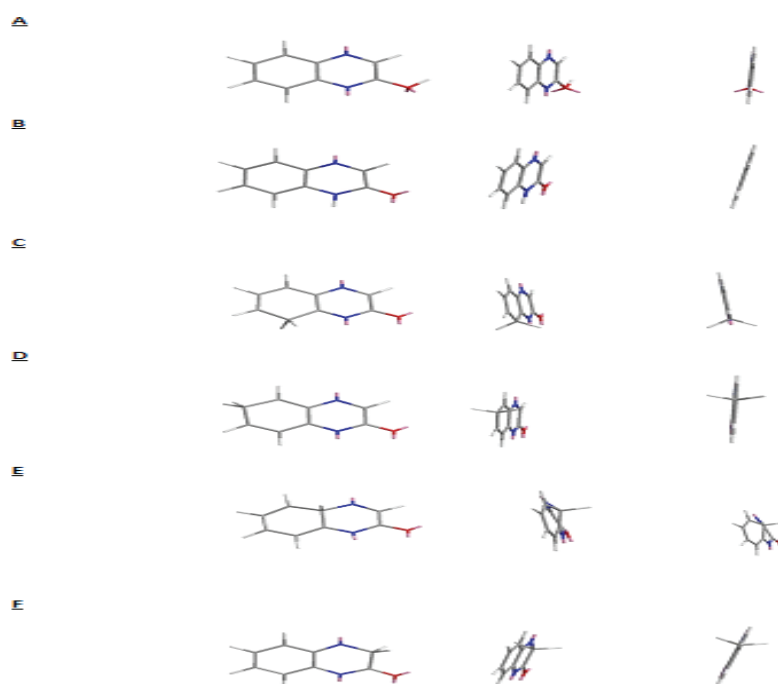


Fig.3. Geometry optimized structures of 2-hydroxyquinoxaline and its possible tautomers

Table 1. Total energies for the tautomers of 2-hydroxyquinoxaline and 2-thioquinoxaline.

Tautomer form	E(kcal/mol) MM2	E(kcal/mol) MMFF94	E(kcal/mol) PM3	E(kcal/mol) AM1
A	8,0909	61.7096	10.7643	27.4747
B	-3.1310	48.3648	4.2336	15.4896
C	16,2504	86.458	32.0977	49.3412
D	17,0171	67.3666	33.076	50.8684
E	22,1392	92.7659	40.2524	58.1903
F	13,3967	97.5804	32.3926	51.7978
A'	8.0065	72.1759	62.6955	71.1233
B'	3.1540	51.4457	72.0256	71.2397
C'	10.9337	87.7185	101.9483	101.8821
D'	11.6030	68.2832	103.0532	103.4473
E'	14.7439	92.0854	110.9545	111.2692
F'	8.8385	97.1013	105.5755	107.3637

#### 4.2. FTIR and NMR spectrum analysis

In other hand, the foregoing theoretical results are in agreement with the experimental data obtained by NMR spectra. As an example, the <sup>1</sup>H-NMR spectra of compound 1 in DMSO-d<sub>6</sub>, proving that in solid state it exists only as the B tautomer, by the presence of proton at δ= 11.50 ppm broad singlet appeared to proton in position 1 of NH, while the proton in position 3 of C3 showed singlet signal at 8.12 ppm in, and multiplet signals within the range 7.73-7.27 ppm of aromatic ring. <sup>13</sup>C NMR spectroscopic data in DMSO clearly indicate the presence of the lactam form of 2-HQ. The O bonded to C2 appears at 151.0 ppm, the C3 carbon appear at 151.5 ppm and four signals at (131.9, 131.7, 130.6, 128.7,123.2, 115.6) ppm assigned to C5, C10, C7,C8, C9, C6 respectively. The IR spectra of 2-HQ are given In Table 3, exhibits the absence of a ν (OH) band, in the 3500–3700 cm<sup>-1</sup> region and the appearance of ν (C=O) mode as strongest band at 1798 cm<sup>-1</sup>. The appearance of ν (N–H) mode indicate that in the solid state 2-HQ exists in the keto form (B). Also, the experimental and theoretical results show that the 2-thioquinoxaline exist in the thione form.



Table 2. IR, <sup>1</sup>H NMR and <sup>13</sup>C NMR spectral data of quinoxaline derivatives

compd	Wave number (cm <sup>-1</sup> ) (KBr)	<sup>1</sup> H NMR δ (ppm) (DMSO)	<sup>13</sup> C NMR δ(ppm) (DMSO)
1	3076(vCHar);	11.50(s, broad, NH);	154.87 (C2); 151.531 (C3); 131.97 (C5);
	1698(vC=O);	8.12(s, 1 H, C3H);	131.76 (C10); 130.68 (C7); 128.71; (C8);
	1642(vC=N);	7.73(m, 1H, C8H) ;	123.19 (C9); 115.66 (C6) 174.9.
	1538(vC=C).	7.51(m, 1H, C5H);	
		7.27(m, 2H, C6HC7H).	
	3076 (ν CHar),	12,17 (s, 1H, NH);	(C2=S); 155.8 (C3) ; 135.3 (C10) ;
3	1559 (ν C=S).	8,74 (s ; 1 H; C3H);	131.6 (C6) ; 131.3(C7) ; 128.7 (C8) ;
		7.93 (m ; 1H ; C8H) ;	125.7 (C9) ; 116.1 (C5).
		7.62 (m,1H, C5H) ;	
		7.44 ( m, 2H, C6HCH7).	
5	3225 (ν C-NH) ;		160.04 (C2) ; 152.88 (C7) ; 148.86 (C9) ;
	3074 (ν CHar) ;	12.4 (s, 1H, NH) ;	144.96 (C3) ; 129.01 (C10) ; 128.19 (C5);
	1674 (ν C=O) ;	8.5 (s, 1H, C3H) ;	122.69 (C8) ; 121.88 (C6).
	1481(νs N=O) ;	8.3 (d, 2H, C5HC6H) ;	
	1338 (vs N=O).	8,1 (s, 1H, C8H).	

#### 4.3. Charge distribution

The calculated density of partial charges are given in Table 5. The charge distribution of the molecules has been examined by using hückel's method. The charge calculation results of 2-HQ reveals that the C5, C6, C7, C8, N1, N4 and O atoms acquired negative charges, whereas the C2, C3, C9, C10 and the remaining hydrogen are positively charged. It is found that the oxygen O and nitrogen (N1, N4) is highly negative in charge in A-F forms. Table 3. Calculated Extended Hückel charge for the A tautomer form (2-hydroxyquinoxaline)

Table 3. Calculated Extended Hückel charge for the A tautomer form (2-hydroxyquinoxaline)

Atom	Extended Hückel charge	Atom	Extended Hückel charge
N1	-0.334	C10	0.116
C2	0.365	O11	-0.214
C3	0.056	H12	0.190
N4	-0.218	H13	0.013
C5	-0.048	H14	0.022
C6	-0.061	H15	0.025
C7	-0.033	H16	0.025
C8	-0.079	H17	0.022
C9	0.154		

In addition, the oxygen atom acquired the most negative charge in B form and due to that; it will most effectively interact with electrophiles. The distribution charges on 2-HQ tautomers can also account for the values of the calculated. The indications of this theoretical study reveals useful information about the reactivity of such molecules, give good information about the active sites in the molecules, and clarify the sites of molecules that undergo nucleophilic substitution or electrophilic substitution reactions.

Table 4. Total energies for the tautomers of 2-hydroxyquinoxaline derivatives.

Atom	Tautomer form						
		A	B	C	D	E	F
Huckel	N1	-0,282	0,447	0,264	0,273	-0,082	0,312
charge's	N4	-0,199	-0,186	0,390	0,337	-0,032	-0,169
	O	-0,287	-0,854	-0,869	-0,898	-0,791	-0,781

## 5. Experimental Reaction mechanism study

### 5.1. Alkylation

Partial charge on N1 and O bonded to C2 in A form present almost similar values, which means that the reaction can take place in these two positions. However, B-F forms show that the oxygen is in the low value as compared to other atoms, thus the reaction is for the O-alkylation. In other hand, the results of MM2 calculation in Table 5. show that the N-alkylation is more stable than the O-alkylation. But the experimental results shows that the reaction is on the oxygen and on the nitrogen.

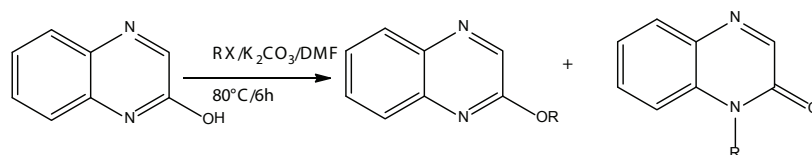


Fig.4. Scheme of O, N-alkylation reaction

Table 5. Total energies for the tautomers of alkoxyquinoxaline derivatives.

	E(kcal/mole) MM2	
	N1-R	O-R
CH <sub>3</sub>	3.5820	13.8669
C <sub>2</sub> H <sub>5</sub>	4.0385	14.5265
C <sub>4</sub> H <sub>9</sub>	5.9413	17.4073
C <sub>6</sub> H <sub>13</sub>	12.4478	17.0524

### 5.2. Thioalkylation

We should also mention that the partials charges of thioquinoxalines presented in the table 6 indicate that forms thiones B'-F' have minimum values at S atom bonded to C2 relative to the configuration of the thiol A'. According to the experimental results (NMR data), the alkylation reaction has taken place on the sulfur atom and according to these theoretical calculations, we deduce that the thioalkylation reaction occur via initial formation of thione form A. The values of the nitrogen charges atoms in positions 1 and 4 and the sulfur atom bonded to carbon 2 are given below:

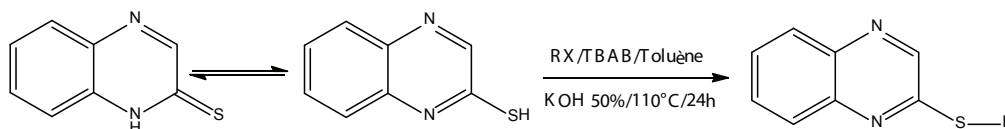


Fig.5. Scheme of thioalkylation reaction

Table 6. Calculated Extended Huckel charge for the A'-F' tautomer form

		Tautomer form					
		A'	B'	C'	D'	E'	F'
Atom	N1	-0,291	0,510	0,295	0,293	-0,037	0,382
Huckel	N4	-0,203	-0,199	0,360	0,311	-0,153	-0,228
charge's	S	0,095	-0,658	-0,638	-0,690	-0,406	-0,515

### 5.3. Nitration

The reaction mechanism of the nitration of 2-hydroxyquinoxaline can be explained as follows: quinoxaline can undergo electrophilic substitution reactions. The agent nitronium electrophile is attacked by the phenyl ring of the quinoxaline. The presence of the hydrogens on the aromatic ring enables the fixing of the nitro group. The orientation of attacks electrophilic reagents is often a function of the electronic effects of their substituents (Holleman rule). The electron attractor substituent (amide) is oriented on meta (5 and 7 position); Conversely the electron-donating substituent of the imine function of the nitrogen lone pair orients on ortho and para (it is again in position 5 and 7). However, as the latter function (amide) is affected by the attractor effect of oxygen in position 2.

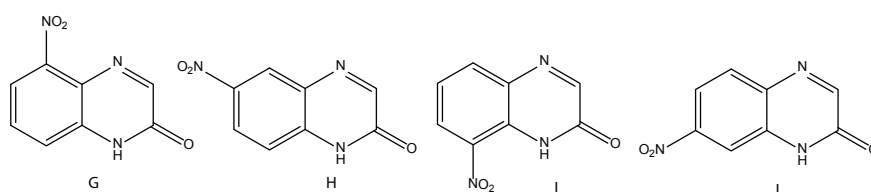


Fig.6. Different positional isomers of 2-nitroquinoxalinones

Calculating energies of different positional isomers of 2-nitroquinoxalinones (Fig.3.) confirmed that the 7 position is the most appropriate to the formation of more stable derivative, the most stable of the four of nitroquinoxaline 2-one positional isomer (G, H, I, J) is J with -14.3370 kcal/mol. In addition, the partial charge precisely in position 7 of the 2-quinoxalinone (Table.3) reveals the value of -0.33, predicts that electrophilic attack in this position is the most favorable.

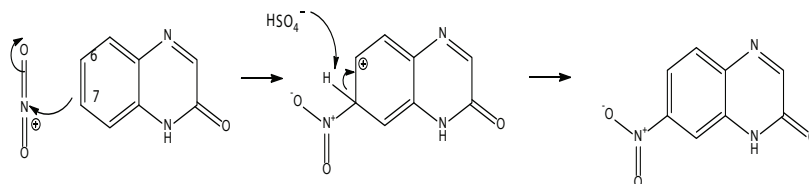


Fig.7. Scheme of nitration reaction mechanism

Table 7. Total energies for the isomers of nitroquinoxaline 2-one.

Positional isomer of nitroquinoxaline 2-one	E(kcal/mol) MM2
G	-3.3256
H	-13.7712
I	-6.7531
J	-14.3370

## 6. In vitro antibacterial and antifungal activities of the molecules

### 6.1. Alkylation Antibacterial activity

In the current study, Synthesized compounds were evaluated for their antibacterial activity against six Gram-Negative organisms such: *Salmonella typhimurium* CLAM 1717, *K.P : Klebsiella pneumoniae* CLAM 25H7, *Pseudomonas aeruginosa* ATCC 27853, *Escherichia coli* ATCC 25922, *Escherichia coli* L.K 12, *Entérobacter cloacae* CLAM 23H2, and three Gram-positive organisms such as: *Staphilococcus aureus* ATTC 22923; *Bacillus supptillus* CLAM 20302; *Proteus sp* CLAM H1917. These bacteria were provided by the laboratory of the faculty of microbiology at the Abbas Farhat University, Algeria. Bacterial and fungal cultures of test organisms were maintained on nutrient specific agar "Agar Mueller Hinton", and were sub-cultured in petri dishes prior to use. These tests are carried on solid medium Methods (antibiogram), the petri dishes were placed in the refrigerator for 30 minutes to ensure good distribution, followed by incubating at 37 ° C for 24 h, the disks are surrounded by circular inhibition zones corresponding to an absence of culture, the diameters of the inhibition zones depend only on the germ sensitivity. Antimicrobial activity was evaluated as zones of inhibition of growth around wells. All samples were tested in duplicate. Ampicillin (30 mg/disc), for bacteria. The antibacterial activity of compounds is shown in Table 7.

Table 7. Antibacterial activity of quinoxalines derivatives.

	Compounds						DMSO	AMPICILIN
	1	2	3	4	5	6		
<i>Salmonella</i>	12	20	15	17	15	12	12	25
<i>K.P</i>	15	21	21	21	20	20	15	32
<i>Staphylococcus</i>	12	14	16	15	12	10	12	38
<i>Bacillus</i>	15	20	13	15	16	12	14	28
<i>Pseudomonas</i>	12	12	12	17	19	15	12	26
<i>E. Coli ATTC</i>	12	-	-	14	18	10	12	28
<i>Enterobacter</i>	14	21	19	20	18	21	13	31
<i>E. coli L</i>	12	13	20	19	20	13	14	34
<i>Proteus</i>	-	-	-	15	15	-	-	22

The studied quinoxaline derivatives exhibited a medium inhibition effect on the tested bacteria and has inhibition zones moderate compare with the ampicillin. Almost all the synthesized compounds have a very important activity against *K.P* and *Enterobacter* strains. 4 and 6 products shows the best results with 21 mm. Concerning the nitrated products (5 and 6), they prove to be an interesting activity against various bacterial strains including: *Enterobacter*, *E. coli L* and *K.P*, indeed the compound 5 has 15-20 mm values. Also Thiol compounds (3 and 4) possess a very interesting activity especially against the strain *K.P*. Despite the total non-solubility of the product 3 in DMSO, it shows quite moderate results, the interesting diameter of inhibition were observed for compound 4.

### 6.2. Antifungal activity

The synthesized compounds were evaluated for their antifungal activity against *Aspergillus flavus* and *Aspergillus niger*. The antifungal activity was studied towards two fungal strains (table 8), the different synthesized molecules have a strong influence against the *Asper.niger*. They have zones of inhibition of 23-24 mm. In addition, the thione 3 compound has a screw remarkable sensitivity against the strain *Asper.flavus*, with an inhibition diameter of 26 mm.

Table 8. Antifungal activity of quinoxalines derivatives.

	Compounds						DMSO
	1	2	3	4	5	6	
<i>Asper.flavus</i>	-	15	26	16	-	16	-
<i>Asper.niger</i>	-	23	23	24	24	24	-

### 6.3. Structure–activity relationship (SAR)

From these results, several observations can be drawn, the literature shows that the presence of the nitro group for imidazole derivatives that have the same activity as quinoxaline gives these molecules specifically targeted antibacterial activity against anaerobic bacteria, as well as some microaerophilic species (*Helicobacter*, *Campylobacter*, *Gardnerella vaginalis*). The hydrogen reduced product progressively the nitro function according to the sequence:



After penetration in the bacteria by simple diffusion, the antibiotic is activated by reduction of its nitro group. These anaerobic bacteria are able to metabolise pyruvate to acetylCoA producing hydrogen by a reaction catalyzed by the oxidoreductase pyruvateferrédoxine: The reduction of NO<sub>2</sub> nitroimidazole is preferably carried out at the bacterial coenzymes (NAD + and NADP +), leading to a decrease of the stock reduced enzymes important for the metabolism of the bacteria. Moreover, some of the free radicals and intermediates are very reactive and therefore likely to directly cause DNA damage. In literature it has already been mentioned that the thione group exhibits inhibition of the activity of urease. This enzyme is present in most bacterial strains. It was also mentioned that the sulfur is capable of chelating iron atoms present in the bacterial hemoglobin, firstly. And secondly the thionation of a compound increases its lipophilicity, hence it allows the compound to cross more easily membranes in biological medium and increases its bioavailability (Amtul et al., 2006). The both fungal strains studied including *Asper.niger* are extremely sensitive to the heterocyclic molecules, the bibliography shows that are azoles, which are responsible for inhibiting the synthesis of ergosterol, the major component of the fungal cell membrane (It is like a bioregulatory membrane fluidity). They prevent methylation of lanosterol to ergosterol in the synthesis of ergosterol (Kathiravan et al., 2012).

## 5. Conclusion

In this study, quantum mechanical calculations namely, MM2, MMFF94, PM3 and AM1 have been applied in order to explore the intramolecular proton transfer process in the tautomers of 2-hydroxyquinoxaline. Based on an analysis of the energies geometric and partial charge parameters, the

results obtained can be summarized as follows: The tautomer B of 2-hydroxyquinoxaline and B' of the 2- thioquinoxaline are the most stable species at all theoretical levels. The tautomer's exhibiting a planar arrangement except the D' and D forms, this is due to the resonance effect of aromatic ring of quinoxaline. The charge distribution analysis of A tautomer reveals that the atoms O, N1 has similar values which favors the O- and N-alkylation. The thioalkylation reaction occur via initial formation of thione form A, which then react with the alkyl halides. The minimum energy and partial charges values of nitroquinoxalinones correspond to the most stable isomers (7-nitroquinoxalinone) and the most favorable reactions to targeted positions. Calculated structures and frequencies of the ligand agree with the available experimental data.

The evaluation of the biological activity has been shown rather acceptable. It should be noted that all tested quinoxaliniques derivatives showed inhibition diameters suitable to that of ampicillin (reference antibiotic). In view of these results, and in particular, the potential interest presented by compound 3 and 4 because of their activities can be considered as interesting seeded. This study is expected to take anti-inflammatory tests, antiparasitic, as the literature gives tremendously interesting results on these topics. Also other bacteria and fungi should be selected to expand the investigation, and disclaim prospects for establishing a pharmacochemical optimization program the results achieved, and continue the development of reclamation of the most promising derivatives.

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## PFP-005

## Drug Delivery System Based On Cross-Linked Cyclodextrin and Its Inclusion Complex: Application in Controlled Release of Diclofenac Sodium

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### Abstract

Cyclodextrins (CD) present significant opportunities in drug delivery systems with their unique and promising characteristic features. They induce improvement in drug release profiles and enhancement in drug solubilization and stabilization by forming inclusion complexes with drugs. The present work focuses on the approaches tested to synthesize crosslinked  $\beta$ -cyclodextrin ( $\beta$ -CDP) as drug carrier for diclofenac sodium (DFCNa), a non-steroidal anti-inflammatory agent. The synthesis was performed by polycondensation using citric acid as a crosslinking agent; sodium dihydrogen phosphate as a catalyst and polyvinylalcohol as a modifier. The FTIR spectra revealed that the hydroxyl groups of  $\beta$ -CD are cross-linked by the carboxyls of citric acid and at the same time the characteristics of the structure of  $\beta$ -CD were well retained in the biomaterial. Then, the co-precipitate mixtures DFCNa/ $\beta$ -CD and or  $\beta$ -CDP, with different molar ratio, were prepared. Binary systems were characterized by FTIR spectroscopy and X-ray diffractometry. In vitro release properties of DFCNa have been investigated in simulated gastric fluid (pH=1.2) at  $37\pm 0.5^\circ\text{C}$ . The kinetics of dissolution of the active ingredient, from the inclusion complex of  $\beta$ -CD in acidic medium, showed that the delivery is reduced with  $\beta$ -CDP, so crosslinking is favored for the controlled release.

### 1. Introduction

Hydrophilic cyclodextrins (CDs) have been recently proposed as modulators of drug-release rate from delivery systems based on different polymer type (Bibbys et al., 2000). CDs have been found to affect transport properties of the drug once incorporated in polymeric platforms such as hydrogels (F. Quaglia et al., 2001), gels and erodible hydrophilic matrices (Sangalli et al., 2000; Koester et al., 2003; Pose-Vilarnovo et al., 2004; Cappello et al., 2006; Miro et al., 2006; Rao et al., 2001; Jain et al., 2002; Chowdary et al., 2003) as well as biodegradable microspheres and capsules (De Rosa et al., 2005; Quaglia et al., 2003). In delivery systems based on hydrophilic polymers, CDs were demonstrated to speed up or slow down drug-release rate in aqueous media depending on drug loading of the matrix and diffusivities of drug, CD and their complexes in the hydrated polymer. In particular, the addition of CDs in hydrophilic erodible platforms containing poorly water-soluble drugs, which are not completely solubilized in the progressively hydrating layer, was found to increase drug-release rate by increasing drug-dissolution rate inside the matrix (Koester et al., 2003; Pose-Vilarnovo et al., 2004; Cappello et al., 2006; Miro et al., 2006; Rao et al., 2001; Jug et al., 2004). A progressive increase of drug-release rate could be achieved by loading matrix with drug/ $\beta$ -CD binary systems obtained by different procedures and displaying progressively higher dissolution rates (Koester, L.S., 2003; Cappello et al., 2006; De Rosa et al., 2005; Jug et al., 2004). Overall, these studies suggested that the effect of CDs could be mainly ascribed to how polymer and CDs are combined in the system and to the occurrence of drug/ $\beta$ -CD interactions inside the matrix (since complexation changes drug solubility inside the delivery system). On the other hand, much less is known on the effect of CDs added in hydrophilic matrices containing highly water-soluble drugs which are completely solubilized inside the swollen layer. Due to their excellent bioadhesive properties, polyvinylalcohol (PVA) matrices have been proposed as buccal delivery systems (Cappello et al., 2006; Bottenberg et al., 1991; Tiwari et al., 1999). The development of buccal delivery systems intended for the systemic delivery of poorly water-soluble drugs is generally a very challenging task. Actually, lipophilic drugs are well absorbed through oral epithelia but produce limited drug fluxes due to a low chemical potential gradient, which is the driving force for transport. The addition of beta-cyclodextrin ( $\beta$ -CD) and crosslinked  $\beta$ -CD in the capsules was found to be a suitable strategy to accelerate drug-release rate while maintaining good bioadhesive properties.

Diclofenac, 2-[(2,6-dichlorophenyl)amino] phenylacetic acid (DFCNa, Fig. 1) was chosen as a model drug because it is a potent nonsteroidal anti-inflammatory drug, therapeutically used in inflammatory and painful conditions of rheumatic and nonrheumatic origin. It is an acid compound ( $\text{pK}_a=4.18$  at  $25^\circ\text{C}$ ) with a very low aqueous solubility (0.02 mM at  $25^\circ\text{C}$ ) in the unionized form. For low water-soluble drugs, dissolution is the rate determining step in the absorption process. An improvement in the dissolution characteristics of these drugs results in higher plasma peaks, as a consequence of their increased absorption rate. The aim of this work was to improve the pharmaceutical properties (ie, aqueous solubility, dissolution) of diclofenac and in vitro permeation behavior of diclofenac/ $\beta$ -CD or and crosslinked  $\beta$ -CD binary systems was performed. Water-insoluble  $\beta$ -CDP was synthesized using citric acid (CA) as crosslinking agent and sodium dihydrogen phosphate (DHPNa) as catalyst. The structure of  $\beta$ -CDP was characterized by Fourier-transform infrared spectroscopy (FT-IR). The resulting matrix of this method was used for preparing co-precipitated mixtures with diclofenac DFCNa/ $\beta$ -CD and DFCNa/ $\beta$ -CDP according to the molar ratio 1/2; 2/3; 3/4; 7/4. These complexes were characterized by FTIR and XRD. The release study of the active ingredient from gelatine capsules containing the complex DFCNa/ $\beta$ -CD and DFCNa/crosslinked  $\beta$ -CD was performed at simulated gastric pH (pH=1.2). A comparison of the release profiles was made between native and cross-linked matrices.

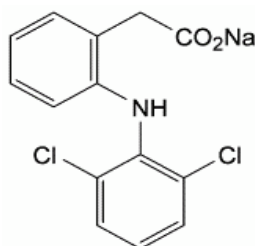


Fig. 1. Chemical structure of diclofenac sodium

## 2. Materials and methods

### 2.1 Materials

$\beta$ -Cyclodextrin and Diclofenac sodium were purchased from Sigma-Aldrich. Citric acid (CA), sodium dihydrogen phosphate (NaDHP) and polyvinylalcohol (PVA) are analytical pure reagents purchased from Fluka-Guaranter and Prolabo. Potassium bromid (KBr) used for FTIR is a spectrum pure reagent purchased from Riedel-deHaën. White capsules in gelatin with 13, 6 mm  $\times$  4, 85 mm in dimensions were used.

### 2.2. Synthesis

1g of  $\beta$ -CD; 0.5g of acetic acid; 0.05g DHPNa and 0.12g of PVA were mixed in 30 ml of distilled water. The whole is heated under stirring at 160°C for 30 minutes. After cooling, the mixture was transferred to a petri dish and then dried in an oven at 50°C until obtaining a powder with a moisture of 6%. At the end of the powder is sifted in a mortar.

### 2.3. Samples preparation

In a flask,  $8.8 \cdot 10^{-4}$  mole of the  $\beta$ -CDP and  $17.6 \cdot 10^{-4}$  mole of DFCNa are placed (the masses are corresponded to the molar ratio 1/2), then quenched with a small amount of distilled water. The mixture was placed in a flask under stirring for 10 min at 60 °C; the solution obtained is poured into a petri dish, heated in an oven (50°C) to evaporate the water. The powder is mixed occasionally until a granulated product. In the end, the powder obtained is passed through a 45 $\mu$ m sieve when humidity reaches a value equal to 6%. Other proportions DFCNa/ $\beta$ -CD were prepared according to the following molar ratios: 2/3, 3/4, 7/4; and this in order to see the effect of the concentration of the active ingredient in the formation of the inclusion complex. The same procedure is applied to the  $\beta$ -CD matrix with the same molar ratios.

### 2.4. Characterization

Fourier transformed infrared spectroscopy (FTIR) spectra of pure DFCNa and  $\beta$ -CD, as well as their binary products were obtained using a 8400S, SHIMADZU system and pellets of KBr. The scanning range was carried out between 400 to 4000  $\text{cm}^{-1}$  and the resolution was 4  $\text{cm}^{-1}$ .

Powder X-ray diffraction patterns were recorded on D8-ADVANCE BRUKER-AXS. The software used is that of WinPLOTR to determine the positions of the peaks of the spectrum and their integrated intensity. For the refinement of lattice parameters we used the software Celref V3.

### 2.5. Release studies in vitro

In vitro dissolution studies of pure drug and binary systems were performed using transparent gelatin capsules containing an amount of DCFNa. The release of DCFNa from their hosts was determined by UV-Vis spectroscopy. The dissolution medium is proposed to simulate the physiological conditions well. The dissolution tests were performed according to the European Pharmacopoeia 3<sup>rd</sup> edition. A rotating paddle apparatus type Heidolph RZR 2041 and a 900 mL beaker containing the buffer solution are used. The temperature was maintained at  $37 \pm 0.5^\circ\text{C}$ . The stirring speed of pallets is set at 100 rpm/min (Lamalmi et al, 2004).

## 3. Results and discussion

### 3.1 FTIR of Cross-Linked $\beta$ -Cyclodextrin

FTIR analysis of the spectrum of the crosslinked  $\beta$ -CD, in the presence of PVA, show that the crosslinking is indicated by the appearance of the absorption band at 1733  $\text{cm}^{-1}$  corresponding to the stretching vibration of the carbonyl of the ester thus formed. The reaction yield is 60.23%.

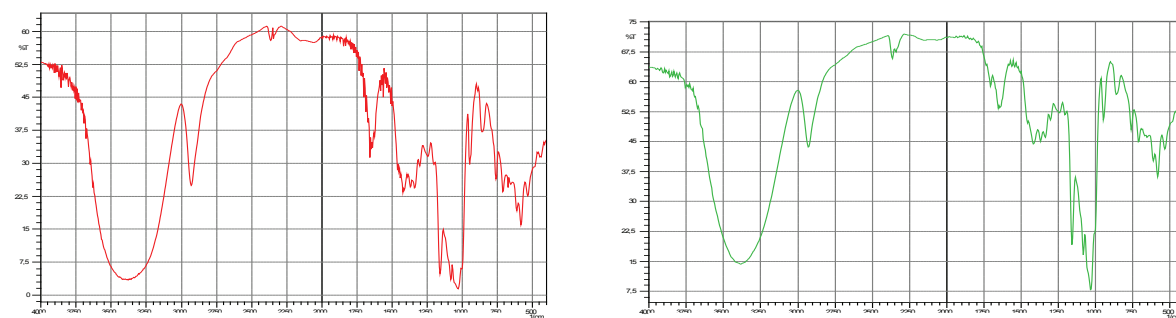


Fig. 2. (a) FTIR spectra of  $\beta$ -cyclodextrin; (b) FTIR spectra of cross-linked cyclodextrin

The other bands in each of the two spectra are at  $3375\text{ cm}^{-1}$  and  $2928\text{ cm}^{-1}$  corresponding to stretching vibrations of OH and CH-glucose unit, respectively. The absorption at  $1650\text{ cm}^{-1}$  and  $1300\text{ cm}^{-1}$  can be attributed to the bending vibration of water molecule adsorbed on the  $\beta$ -CD. The reaction proceeds according to the following mechanism:

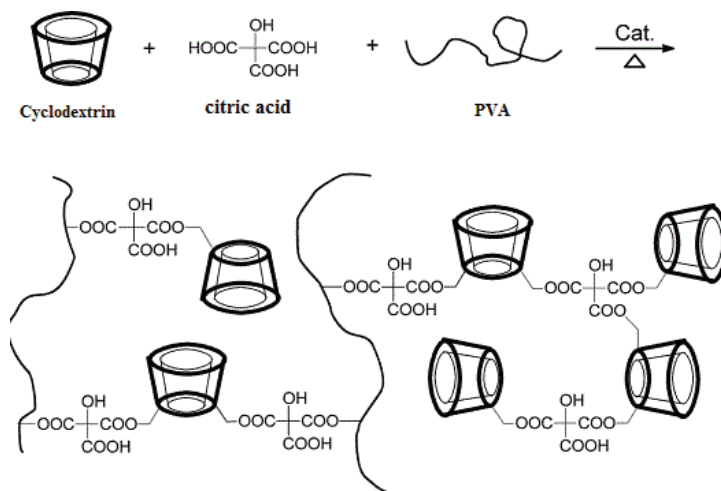


Fig. 3. Béta-cyclodextrin/ PVA network

### 3.2 FTIR spectra of inclusion complexes

In the case of complex DFCNa/ $\beta$ -CD; the absorption characteristics have a certain advantage. Indeed, the DFCNa absorbs strongly in the region where the  $\beta$ -CD but does weakly. This region could then be used to study the interpretation host/guest. The FTIR spectrum of DFCNa/ $\beta$ -CD (Fig. 4) showed bands corresponding to vibration modes of  $\nu(\text{COO})$  of DFCNa and deformation OH of the water molecule inside the cavity of  $\beta$ -CD; Note that, the  $\nu_{\text{as}}$  absorption bands  $\nu_{\text{as}}(\text{COO})$  and  $\nu_{\text{s}}(\text{COO})$ , were observed for pure DFCNa at  $1567\text{ cm}^{-1}$  and  $1394\text{ cm}^{-1}$ . The same bands are presented in the coprecipitate mixtures but their position are moved to lower frequencies;  $\nu_{\text{as}}$  observed (COO) at  $1559\text{ cm}^{-1}$  and  $\nu_{\text{s}}(\text{COO})$  at  $1382\text{ cm}^{-1}$ . This shift in frequency has been interpreted by the fact that a rupture of intermolecular hydrogen bonding associated with these molecules and the establishment of a stronger bond in the complex system (Bratu et al., 1998; Szejtli., 1982)

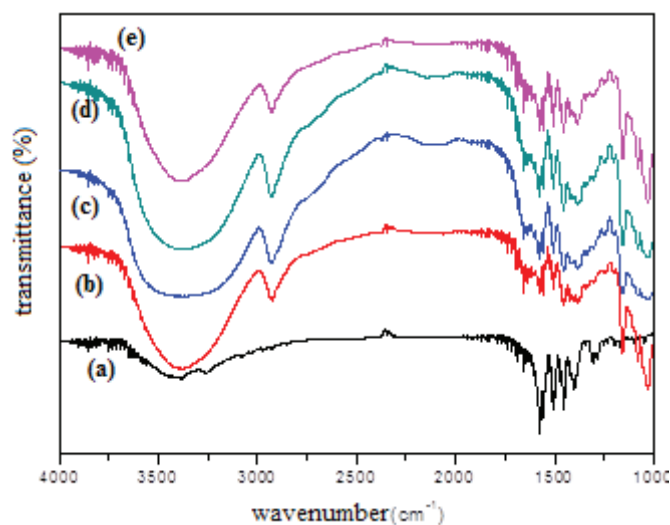


Fig. 4. FTIR spectra of (a) DFCNa; DFCNa/ $\beta$ -CD (b) 1/2; (c) 2/3; (d) 3/4; (e) 7/4

The FTIR spectra of the  $\beta$ -CDP and binary systems indicated an intensive absorption band at  $1733\text{ cm}^{-1}$  which is found in the spectrum of the mixtures, but at low frequencies ( $1695.43\text{ cm}^{-1}$ ) and which is due to the elongation vibration of carbonyl group (C=O) of the ester bond. Also, the band observed at  $1234.44\text{ cm}^{-1}$  is due to stretching vibrations of the C-O-C of the ester groups in  $\beta$ -CDP, while the latter exists in the spectrum of the binary systems but at low frequency. Broadband at  $3421.72\text{ cm}^{-1}$  for the  $\beta$ -CDP and  $3420.51\text{ cm}^{-1}$  for the DFCNa, is found in the mixtures at  $3385.07\text{ cm}^{-1}$ , these bands are characteristic of the OH and NH groups of the two molecules, respectively. The bands appeared at  $2927.94\text{ cm}^{-1}$  ( $\beta$ -CDP) and  $2929.87\text{ cm}^{-1}$  (DFCNa) correspond to the  $\text{CH}_2$  asymmetric stretching vibration. The characteristic bands of the dichlorophenyl ring and the phenyl acetate are observed at  $1508.33\text{ cm}^{-1}$  and  $1560.41\text{ cm}^{-1}$  in the spectrum of the co-precipitate mixture. All these indications confirm the formation of an inclusion complex between the  $\beta$ -CDP and DFCNa.



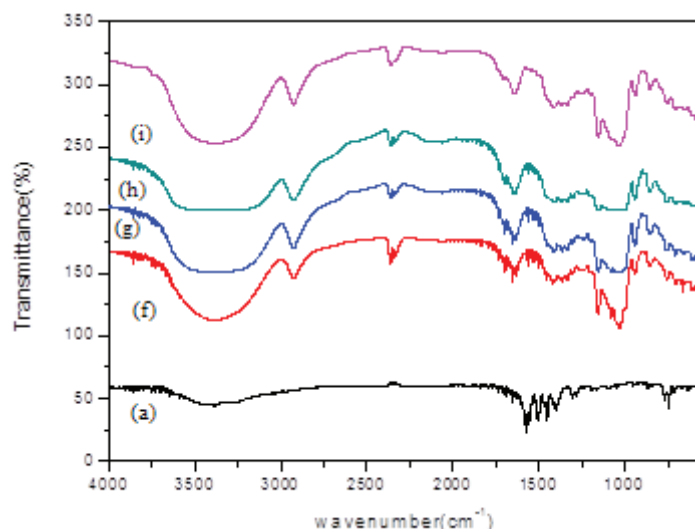


Fig. 5. FTIR spectra for binary system of DFCNa/ $\beta$ -CDP coprecipitated mixture ratio molar (f) 1/2; (g) 2/3; (h) 3/4; (i) 7/4  
 3.2 XRD analysis

From these results of X-ray diffraction, the reflectivity is measured in the range of the angles  $\theta$  from 0 to 20°. The spectrum of the native  $\beta$ -cyclodextrin, when compared with those of diclofenac sodium showed a higher number of reflection of a higher intensity. The diffractogram of DFCNa said other higher intensities. The diffractogram of coprecipitate mixture DFCNa/ $\beta$ -CD indicated characteristic peaks of the inclusion complex that which changes for each molar ratio; appearance indicated the formation of a new crystal inclusion complex ( $\beta$ -CD/DFCNa). Indeed, for these systems, the diffractogram exhibit a considerable decrease of the peaks suggest that leaving the mixture is less crystalline.

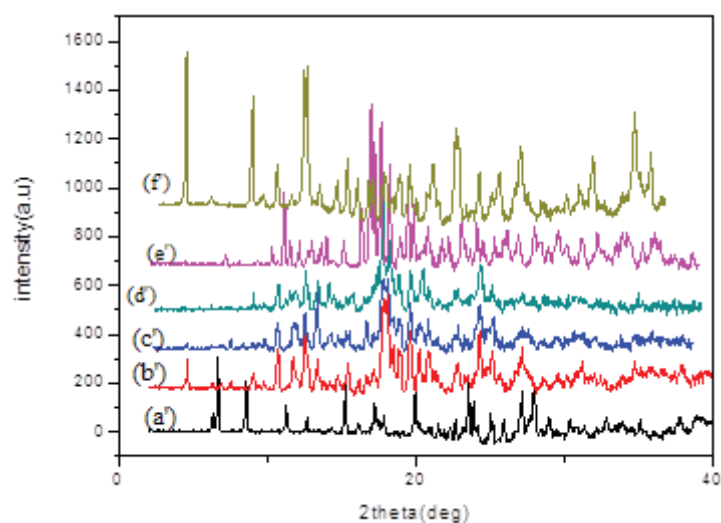


Fig. 6. XRD patterns of (a) DFCNa; (b) DFCNa/ $\beta$ -CD (1/2); (c) 2/3; (d) 3/4; (e) 7/4; (f)  $\beta$ -CD

The same interpretation for the coprecipitate mixtures of DFCNa/ $\beta$ -CDP. There is a divergence in the diffraction diagram of the  $\beta$ -CD with that of  $\beta$ -CDP; it shows the most intense peaks compared with those observed in the  $\beta$ -CD. The diffractogram of DFCNa, the  $\beta$ -CDP and their mixture showed that diclofenac sodium formed a new crystal. This is proved by the distance corresponding to the peaks appeared in the diffractogram of the coprecipitate mixtures whose values. These distances, which are not included or in the diffractogram of the crosslinked  $\beta$ -CD or in the DFCNa, confirm the formation of an inclusion complex.

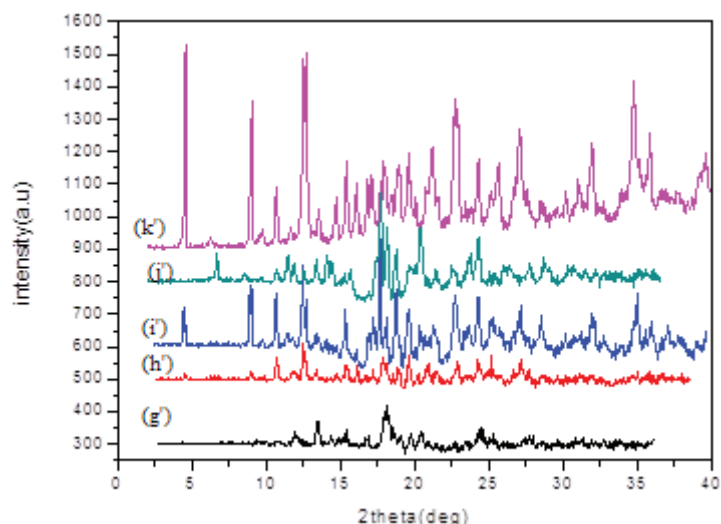


Fig. 7. XRD patterns of DFCNa/β-CD (g') 1/2; (h') 2/3; (i') 3/4; (j') 7/4; (k') β-CDP

### 3.3 Release study

After analyzing the curves, we note first that in each case the DFCNa release rate from the different capsule where the carrier, is the β-CDP is lower compared with that the carrier is the β-CD.

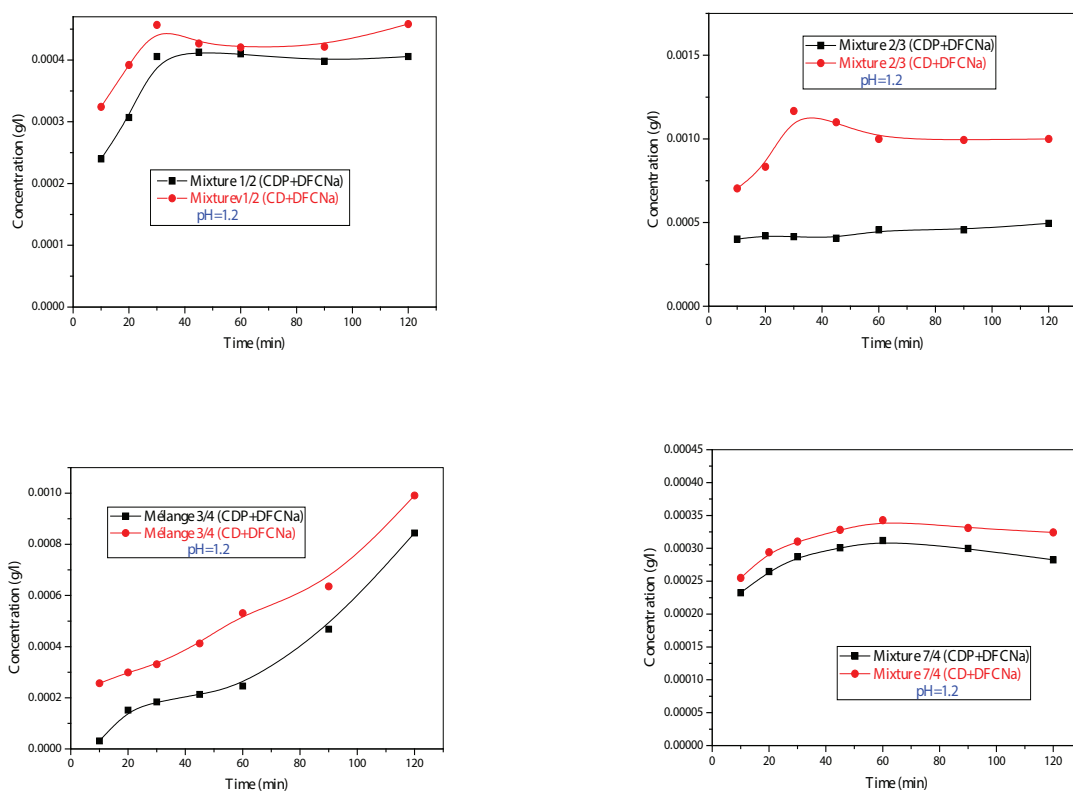


Fig. 8. Release profiles of coprecipitated mixtures

The curves of dissolution kinetics, for most samples of the coprecipitates mixtures, have a similar appearance: the solution is initially very rapid. During the first 10 minutes, the dissolved amount is very high, with over 80% of the active ingredient initially present in the capsule dissolves in that time frame. Then the curves are inflected tray because almost all of the active ingredient is dissolved. Delays to the dissolution statements to during testing could be due to one side to the gelatin shell, but on the other hand, it slower dissolution can only be assigned to a factor inherent in the powder contained in the capsule, the quantity and quality of the excipients. So the coprecipitation is better for sustained release of the active ingredient.

The controlled release system chosen in our experiments can be simulated to the one controlled by diffusion and more specifically to a system reservoir. In this case, the active substance included in the host matrix is surrounded by the polymer (gelatin) which swells in the solution (acid medium). It is the structure of the polymeric membrane that controls the release. The release process of DFCNa requires, first, that frees from the host matrix (or

not), distributes in the membrane and then diffuses, finally passes into the release medium. The shape of the gelatin capsule is cylindrical with domed ends, the mathematical model that handles the release becomes very complex.

#### 4. Conclusion

In this work, we focused on  $\beta$ -cyclodextrin as it has a great ability to form inclusion complexes. Then we synthesized the crosslinked  $\beta$ -CD by a simple and effective methods based on the esterification reaction of  $\beta$ -CD with citric acid in the presence of sodium dihydrogen phosphate and PVA at 160 °C for 30 minutes. The crosslinked matrix obtained was used to prepare capsules containing the coprecipitated mixtures DFCNa/ $\beta$ -CD or/ and  $\beta$ -CDP with the following proportions: 1/2, 2/3, 3/4, 7/4. Inclusion complexes have been identified by FTIR analysis and XRD. The study of the kinetics dissolution of different systems DFCNa/ $\beta$ -CD and DFCNa/ $\beta$ -CDP shows that the slowing of the kinetics of release is dependent to some extent of crosslinking and to a lesser extent for the formulation of capsules.

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## PFP-006

**Characterizations of Compression Moulded Polymer Composite Reinforced with Kenaf Fiber**

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**Abstract**

Kenaf composites have been widely used for the engineering and industrial applications such as air cleaner, dashboard, insulation mats, fibreboard and etc. Due to considerable attentions, kenaf fibers are reinforced in polymers for the fabrication of polymer composites. This work deals with the fabrication and characterizations of untreated and treated *temafa* kenaf fibers. The physical, microstructure, and mechanical properties of the prepared kenaf polymer composites were discussed in this study. The kenaf fibers were treated with 6 wt% sodium hydroxide (NaOH) solution for 24 hours soaking time. The epoxy thermoset reinforced with randomly oriented *temafa* kenaf was fabricated using compression molding technique. The composite samples of kenaf were prepared with different fiber loadings; 20%, 30%, 40% and 50% in weight. It was found that the properties of kenaf composites mainly depend on the compositions of kenaf fibers. It has also been investigated that the treatment influences the properties of kenaf itself. Overall, the results revealed that the treated kenaf composites have better mechanical properties such as flexural strength as compared to the untreated kenaf composites. However, it is observed that the flexural strength also increases with the increment percentage of kenaf fibers. Finally, these prepared kenaf composites with better mechanical properties may be used for automotive applications.

**1. Introduction**

The interest of using renewable and biodegradable natural fibers as reinforcement materials in polymer composites had been increased in industries also academic field (Nguong et al., 2013; Mohanty *et al.*, 2005). The increment of using natural fibers is to replace the conventional synthetic or manmade fibers; Kevlar, glass, carbon and etc. This is due to the natural fibers are environmental friendly, economically purpose and in addition it's beneficial to the health concern. As compared to synthetic fiber, the natural fiber has many advantages in low density, reduce cost, easily available in most countries. Furthermore, they offer less abrasive to tooling processing, less irritating for the human in respiratory system, good thermal properties. These advantages are become interest to form the lightweight composite especially in automotive and aerospace industries in order to reduce the weight and also fuel saving.

In recent years, there are numerous of natural fibers have been utilized in fabrication of polymer composite such as jute, flax, pineapple, flax and etc. Among of these natural fibers, kenaf fiber has been used as a reinforcement materials (Chin et al., 2010). Historically, the kenaf fiber had been achieved incorporated in various applications; constructions, automotive, building and etc. The kenaf fiber has been extensively accepted in automotive industries for fabrication of interior and engine part such as headliner, dashboard, air cleaner and door trim in recent years (Ishak et al., 2010). This is because kenaf fiber has interesting mechanical properties in flexural strength and tensile strength. Generally, kenaf plant consist with inner woody core and outer bast that surrounding the core. The kenaf plant contain 35 – 40 % bast fiber and 60 – 65 % core fiber (Khalil et al., 2010). In contrast to core fiber, bast fiber comprehensively used in production composite materials; thermoset and thermoplastic as a matrices. This is because kenaf bast fiber consisting of high cellulose content which can effect to the excellent physical and mechanical properties. This finding was supported with other work by Ishak, et al. (2010). The most popular thermoset and thermoplastic polymer used in fabrication of kenaf fiber is polypropylene, thermoplastic urethane, epoxy, polyurethane and polyester. In this work, epoxy resin was used as a matric to bond the fiber together and to transfer load between them (Yousif et al., 2012).

Although kenaf fiber has many advantages as mention previously, a serious problem of kenaf fiber where difficulties in mixing between kenaf and polymer. This is because kenaf has a strong polar character (hydrophilic) which can lead to incompatibility with the most polymer matrices (hydrophobic) (Mahjoub et al., 2014). Therefore, the chemical treatment is required for the kenaf fiber in order to increase the wetting of the fiber with the polymer matric (Abdan et al., 2009). It is well known that, chemical treatment has successfully improve the fiber strength and adhesion between matrices and fiber. Basically, chemical treatment removes lignin, hemicellulose, and wax and oils covering the surface of the fiber which can leads to the better adhesion between fiber and polymer. Various chemical treatment was tested on the natural fibers. From the previous work, several researchers have reported the properties of the kenaf composites when treated with the alkali treatment at different concentration and condition. Meon et al. (2012) has treated the kenaf fiber with different concentration; 3%, 6% and 9% in weight percent. They found that 6wt% of NaOH has good tensile properties. This also supported by the Edeerozey et al. (2007) and they also found that at concentration 6wt% remove all impurities from the SEM micrograph. Therefore, in this work 6wt% concentration of NaOH was selected as a chemical treatment due to the effectiveness in cleaning the fiber surface (Azwa et al., 2013). The main of this work is to fabricate epoxy polymer composite reinforced with different kenaf fiber. This paper is focus of the effect of the alkali treatment and effect of fiber loading on the kenaf/epoxy composite.

2. Experimental Procedure

2.1 Material

Polymer composites materials were prepared using epoxy resin and *temafa* kenaf fibers. Epoxy (D.E.R™ 331™) resin as matrix and curing agent (JOINTMINE™ 925-3S™) was provided by the Dow Chemical Company. This epoxy come together with the hardener (JOINTMINE™ 925-3S™) for the fast curing process. The discontinuous long fibers, *temafa kenaf* were supplied by LKTN, Malaysia. The mechanical properties of the epoxy had been provided from MSDS were summarized in Table 1 as below.

Table 1: Characteristics of resin epoxy, D.E.R™ 331™ [MSDS sheet].

Properties	Value
Flexural Strength (N/mm <sup>2</sup> )	96
Flexural Modulus (kN/mm <sup>2</sup> )	3.0
Yield Compressive Strength (N/mm <sup>2</sup> )	112
Tensile Strength (N/mm <sup>2</sup> )	79
Elongation at Break (%)	4.4
Gel point time (min) 500g	25

2.2. Sample Preparation

Firstly, kenaf *temafa* fiber with diameter 1.71 g/cm<sup>3</sup> and diameter in between 45-250 μm need to be cleaned to separate excessive core. Prior to composite preparation process, alkali treatment process was carried out. The sodium hydroxide (NaOH), MERCK was used for the alkali treatment process with the concentration by 6 % in weight. The kenaf fiber were soaked in NaOH solution for 24 hours under room temperature. Then, the fibers were immersed in tap water containing with 1 wt % of acetic acid glacial (EMSURE) to neutralize the excessive the NaOH. After that, the fibers soaked for 30 minutes in distilled water to make sure the distilled water and followed by the washing process with distilled water until the pH 7. Then, fibers were dried under oven environment at 40 °C for 24 hours.

Compression moulding process was used for the fabrication of epoxy reinforced with *temafa* kenaf fiber. The composites with size 100 mm x 100 mm and thickness ±3 mm with different percentage of *temafa* kenaf. Five different percentages of kenaf were 0%, 20%, 30%, 40% and 50% in weight were produced from the hardened steel mould. Firstly, the untreated (UT) and treated (T) fibers need to press at 8 tonne for 5 minutes using uniaxial pressing for making the randomly mat shape. Then, epoxy and hardener with ratio 2.1 were mixed using mechanical stirrer at lowest speed rate; 2 rpm for 5 minutes before casting into the mould. These parameters were used in order to avoid bubble and also resin become jelly. The mould was places under compression moulding environment for 15 minutes for the curing process. Then the mould was pressed at 8 MPa of compression moulding for 25 minutes. Afterwards, the specimen was post cure for 15 minutes under room temperature after removed from the compression moulding for the cooling process and kept in the dry cabinet in order to avoid from the humidity. The fabricated composites were cut into rectangular shape with the dimension 25 mm x 100 mm using cutter blade for the characterizations process. During this work, five types of kenaf randomly oriented composites were fabricated with different fiber loading in weight percent of epoxy and kenaf.

2.3. Properties Characterizations

The kenaf composite were characterized by mechanical (flexural and tensile) and microstructure analysis. ASTM D790-99 standard was used to determine the flexural strength and flexural modulus. The testing was done under room temperature using universal testing machine (UTM), Model Instron 5567 with speed rate 2 mm/min and load cell 1kN.

The tensile strength and tensile modulus also were determined according to the standard of the American Society for Testing and Materials (ASTM D3039-14) using universal testing machine (UTM), Model Instron 5567. A load cell 3kN was applied with a cross head speed 2 mm/min. Four samples were tested under room temperature and average of the samples were calculated to get the average of the value.

Scanning electron microscope, SEM (ZEISS) was used to examine the surface and cross section of the sample. The sample micrographs were observed by using secondary of scanning electron microscope at 100x magnification. Before that, the specimens were coated with gold to increase their conductivity during the testing.

3. Results and discussion

3.1. Mechanical Characterization

3.1.1 Flexural Properties

From the histogram in Figure 1[a], it is obvious show that addition of kenaf fiber either treated or not gave superior flexural strength for the composite. Also, the same trend can be seen on the flexural modulus of composite after reinforced with kenaf fiber as shown in Figure 1[b]. The flexural strength and modulus increase with increasing of kenaf loading for both types kenaf; untreated and treated. In this research, the weight percentage of fiber loading is increased up to 50wt%. Based on the graph, the effect of the alkali treatment process can be clearly seen for both graph. In this case, reinforcement treated kenaf of 20 wt % and 30 wt% fiber loading did not give effect to the flexural strength and flexural modulus. Clearly shows that, the results for these fiber loading is lower than untreated kenaf fiber. This is may be undesired treated kenaf at this fiber loading. However, reinforcement of 40 wt% and 50 wt% treated kenaf give superior flexural strength in which increased 9% and 18% compare to untreated kenaf. For the flexural modulus, the increment is 18 % and 23 % for the reinforcement 40 wt % and 50 wt % fiber loading.

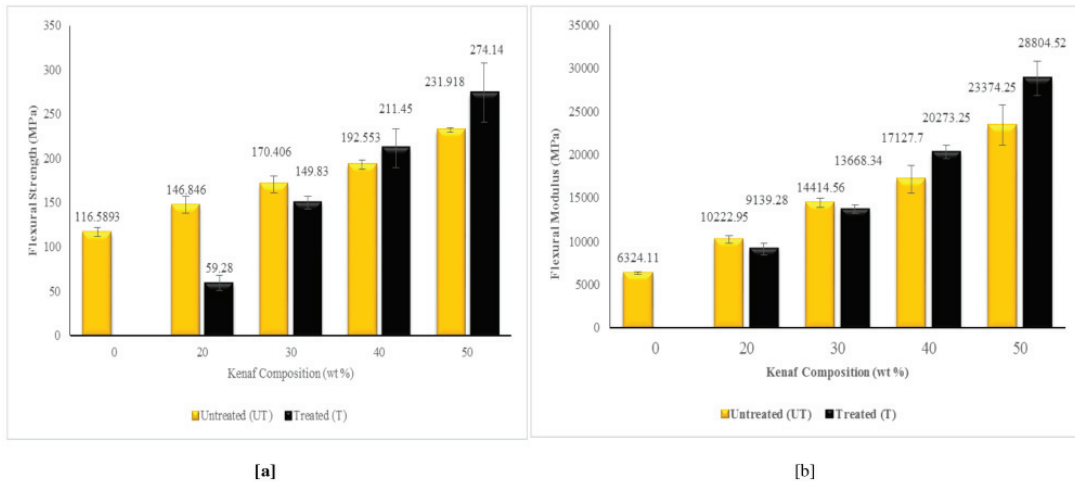


Fig. 1: [a] Flexural strength and [b] Flexural Modulus of Epoxy Composite Reinforced with Untreated and Treated Kenaf Fiber

### 3.1.2 Tensile Properties

Figure 2 (a), (b) and (c) represent the tensile properties of the epoxy composite reinforced with untreated and treated kenaf fiber. All the composite reinforced with the untreated kenaf show higher tensile properties than the treated kenaf fiber. Generally, reinforcement of the fiber increase the tensile strength and modulus due to the fiber has higher strength and stiffness compare to the matrix (Sumaila et al., 2013). However, it is slightly show difference in this work wherein reinforcement of 20 wt % of untreated and treated produced lower tensile strength. From the results, clearly shown that addition of 40wt % of untreated and treated kenaf loading has produced higher tensile strength, tensile modulus and elongation at break. This results is in agreement with the result obtained from the previous research (Abdan et al., 2009). They revealed that 40 wt% of fiber loading produced the higher tensile strength. However, the tensile strength of the epoxy reinforced with 50wt % of for both type of kenaf fiber decreased to 41.431 MPa and 35.508 MPa. The same trend of the decrement also can be seen to the tensile modulus by reinforcing with 50wt% (UT and T) loading where the value decreased to 2282.131MPa and 2039.321. Figure 2 (c) shows that percentage of elongation at break of the epoxy composite reinforced with 40 wt% kenaf is higher than other fiber loading.

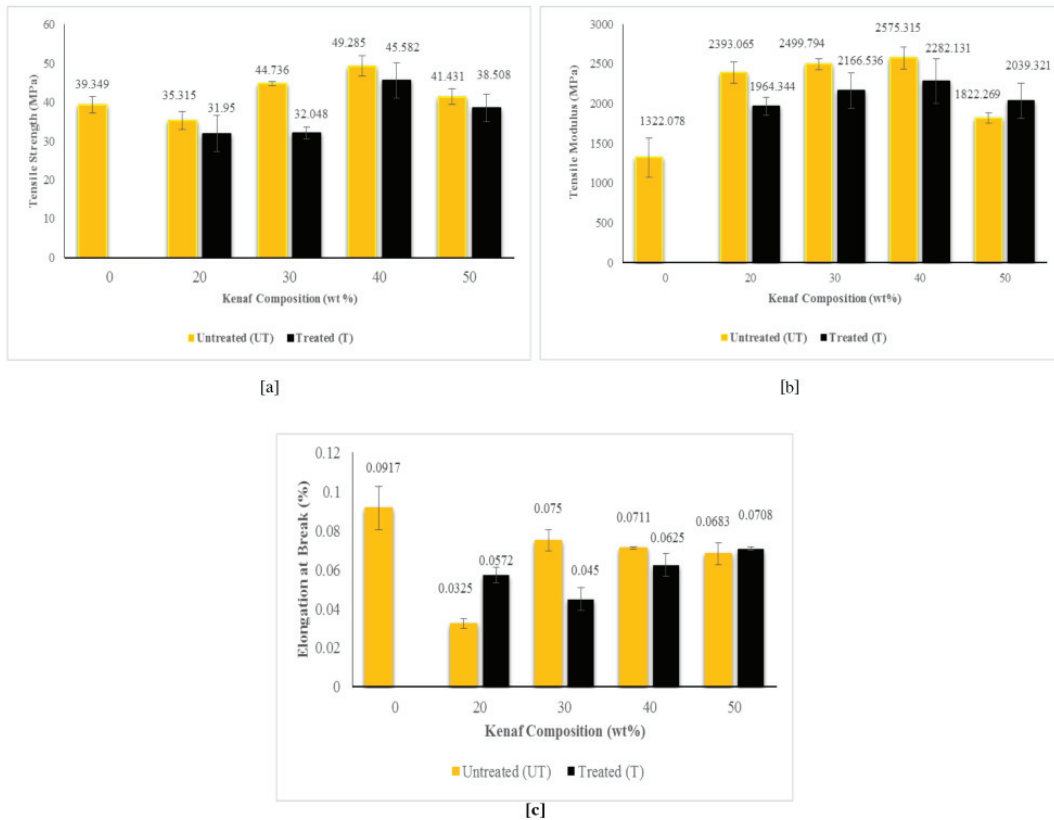


Fig. 2: [a] Tensile strength and [b] Tensile Modulus and [c] Percentage of Elongation at Break for Epoxy Composite Reinforced with Untreated and Treated Kenaf Fiber.

### 3.2. Morphology Characterization

In this section, the distribution and the bonding of the untreated and treated kenaf fiber were observed and analyzed after run the flexural analysis. The SEM observation was illustrated in Figure 3. Based on SEM image, comparison of the result that obtained from the untreated and treated kenaf shows different distribution of fiber. This obviously shows that epoxy resin was not able to enter the untreated kenaf fiber. Generally, the epoxy resin was not distributed evenly will cause the increment of porosity and kenaf fiber do not bonded well with the epoxy resin. Basically, the increment of porosity leads to decrease the mechanical properties of the composite.

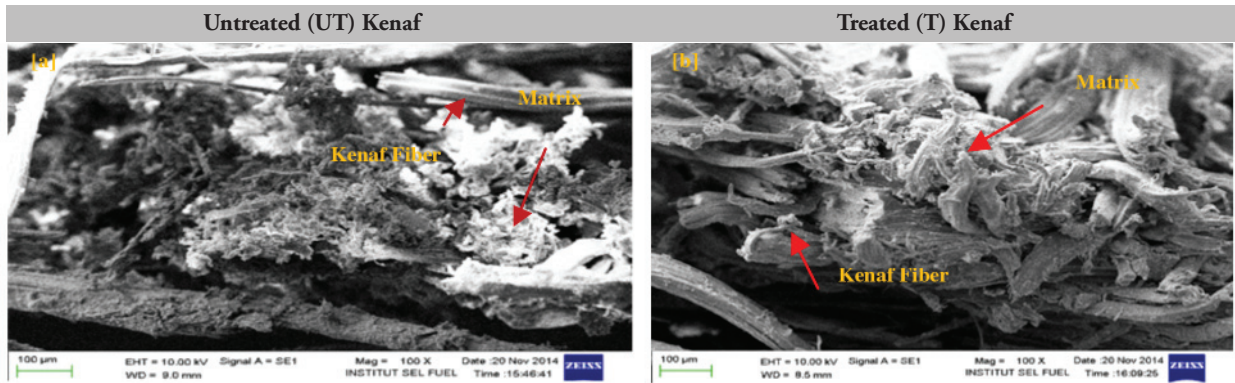


Fig. 3: SEM Observation of Bonding between Kenaf Fiber and Epoxy Resin

### 4. Conclusion

In this present work, the result indicate that alkali treatment and fiber loading of the natural fiber highly influence the mechanical properties of the epoxy composite reinforced with kenaf fiber. From the SEM image, the epoxy composite reinforced with treated kenaf has a better microstructure because the epoxy can enter the kenaf. The discussion on the flexural properties proved that the increment of fiber loading will increase the flexural strength and flexural modulus of the composite. The tensile strength, tensile modulus and elongation achieved a maximum result at the 40wt% of fiber loading for both type of kenaf.

### Acknowledgement

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## PFP-007

## Reproductive Biomarkers of Farmers Exposed Chronically to Pesticide

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## Abstract

The ever increasing use of pesticides in agriculture and public health has become a major cause of sterility in human and various animals, particularly in males. This study was undertaken to screen the impact of pesticides on reproduction among some farm workers in the North east of Algeria. Therefore the reproductive biomarkers of workers exposed to pesticides from pilot farm during spring season in the north east of Algeria were investigated. Subjects were working either in the free-air field, or in the closed greenhouses. A third unexposed group of workers was used as a control. The exposure periods to different types of pesticides were between 2 and 11 years. Blood samples were collected in the morning and the serum levels of luteinizing hormone (LH), follicle stimulating hormone (FSH), testosterone (T), estradiol (E2), free thyroxin (FT4), total triiodothyronine (TT3) and thyrotropin (TSH) were estimated by the enzymatic immunoassay method. The obtained results showed a significant decrease in the LH concentration of the greenhouse workers compared to the control. There was also a significant depletion in the FSH and testosterone levels of all workers exposed to pesticides. The concentration of T3 have not been affected during pesticides' exposure. However, a significant decrease in the concentration of T4. On the other hand, the level of TSH and estradiol were significantly risen only in the greenhouses workmen compared to the control. To conclude, the exposure to pesticides could disrupt some reproductive biomarkers, especially those working in closed area of greenhouses.

## Introduction

To meet the increasing demands of food requirements for the increasing world populations, certain policies aiming to raise agricultural production are applied. Such agricultural practices depends mainly on the use of the agrochemical products particularly the use of pesticides in the elimination of bad herbs, fungal diseases or harmful insects. This strategy has been shown to be advantageous in improving harvest production. However, side effects, particularly on human health, such as leukemia, non-Hodgkin's lymphoma and other cancers have been reported since the early days of the use of pesticides. Moreover, certain neurologic pathologies, respiratory symptoms and hormonal and reproductive abnormalities have also been associated to pesticide exposure. It is now well reported that a total of 91 pesticides are considered as endocrine disrupting chemicals. However, the disorders generated by the endocrine disruptive pesticides can be temporary or permanent. It can provoke reproductive abnormalities by reducing both fertility and fecundity or congenital malformations. In males, the primary effects of pesticides have been the reduction in sperm concentrations. In females, the effects appear through the disruption of hormone levels, menstrual cycle, reduced fertility, polycystic ovary syndrome, obstruction or lesion of the genital tracts, precocious puberty, prolonged time to pregnancy, spontaneous abortions, still birth and development defects. Hormonal balance of sexual hormones in particular is an important factor in maintaining fertility and regulating reproductive processes. Exogenous substances, such as environmental endocrine disruptors, may disturb the hormonal balance and thereby cause reproductive disorders.

Accordingly, it therefore seems interesting to elucidate the impact of pesticides on some of the reproductive parameters in some farm workers in the North East of Algeria, following their exposure to different periods to pesticides.

## Materials and Methods

The study has been carried out on agricultural workers from the the wilaya of Skikda, in the North east Algeria during the period of February-June, 2008. The survey consists of choosing two groups of exposed workmen; one group constitutes subjects working in the free-air field (n = 20), whereas the other group represents the closed agricultural area of greenhouses (n = 20). Yet, a third control group issued from unexposed workers. Blood samples were collected at 08 am and 10 am, one day following the last use of the pesticide. The blood was centrifuged at 3000 rpm for ten minutes, before being stored at -20 °C until use for hormone assays. Serum levels of LH, FSH, testosterone, estradiol, T3, T4, and TSH were determined by automated micro particle enzyme immunoassay.

## Results

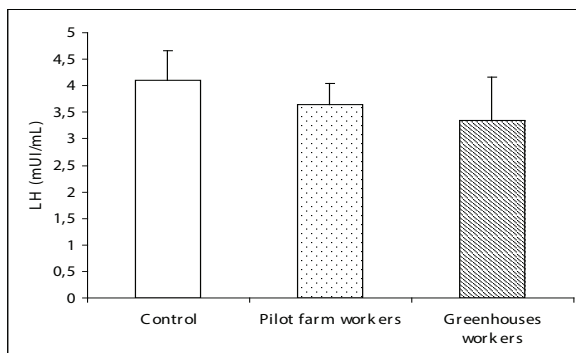


Fig 1. The serum concentration of LH in three groups of agriculture workmen.

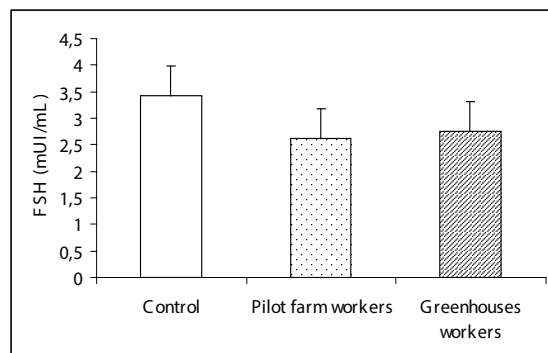


Fig 2. The serum concentration of FSH in three groups of agriculture workmen workers



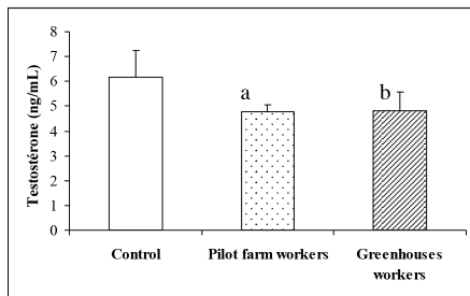


Fig 3. The serum concentration of testosterone workmen groups of agriculture workmen.

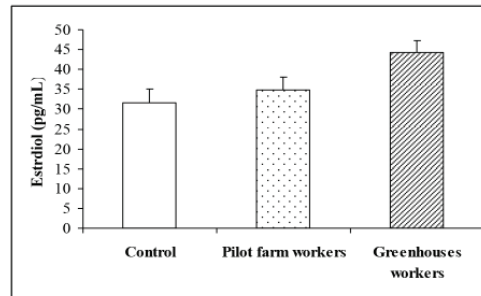


Fig 4. The serum concentration of estradiol in three in three groups of agriculture

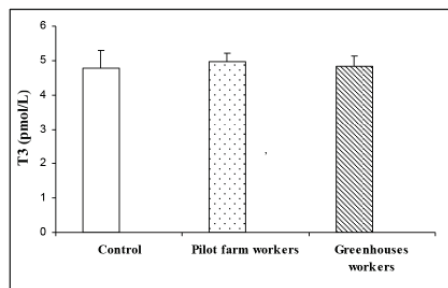


Fig 5. The serum concentration of FT3

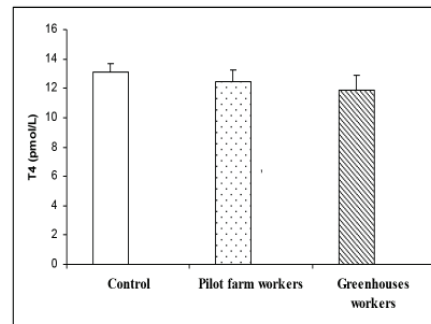


Fig 6. The serum concentration of FT4

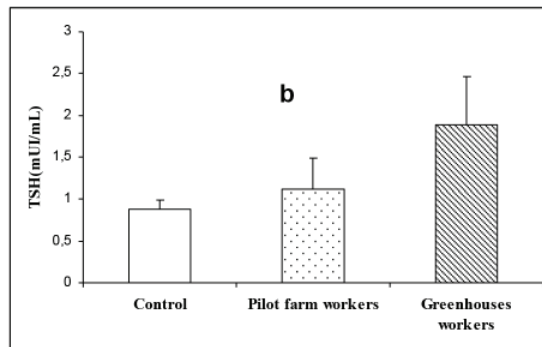


Fig 7. The serum concentration of TSH in three groups of agriculture workmen.

## Discussion

The present study reveal a remarkable decrease in serum LH and FSH levels in workers following exposure to pesticides, and that compared to control ones. Such a fall might be due to either an inhibition of GnRH synthesis, or to the saturation of the pituitary receptors. Furthermore, the lower levels of LH observed in the farmers exposed to pesticides could explain the low values of testosterone shown in these same workers, through a feedback mechanism. On the other hand, it is more likely that the used products mimic or generate the same physiological effects of LH on the Leydig cells receptors, involved in maintaining a physiological level of testosterone. Therefore, it has been suggested that pesticides impairing or changing normal reproductive process in humans and other vertebrates act primarily by altering estrogenic and anti-androgenic activities. Thus, pesticides are believed to act by mimicking sex hormones such as estrogens and androgens; in interacting with plasma membrane as well as with nuclear receptors and altering the pattern of steroid synthesis.

However, the high levels of estradiol recorded in this current study among farmers suggest an estrogenic effect of these pesticides, leading to the aromatization of androgens to estrogens. It seems, therefore, that these pesticides activate the aromatase through the conversion of testosterone to estradiol. On the other hand, the thyroid gland seems to be also, somehow, affected by the use of pesticides. A slight decrease in T4 concentrations coupled to a significantly increase in TSH were observed. These results can also be assigned to a mechanism that reduces thyroxine by the thyroid hormones metabolism. Therefore, pesticides may activate the nuclear receptor constitutive androstane receptor, which in turn induces enzymes involved in thyroid hormone metabolism, including uridine 5'-diphosphate-glucuronosyltransferase and sulfotransferase. This may lead to increased hepatic metabolism of

thyroid hormones, resulting in decreased plasma T<sub>4</sub> and increased TSH level. Furthermore, pesticides may also affect the binding of thyroid hormones to thyroid receptors, resulting in an alteration in the expression of genes. This may then affect thyroid hormone metabolism and thereafter alters their levels. In addition, several pesticides were repeatedly reported to bind transthyretin—one of two major binding proteins in human and animal plasma, where some of them have the same affinity as that of T<sub>4</sub> or even much higher. Though, some pesticides bind also to thyroxin binding globulin. Virtually, most body tissues are affected by the thyroid hormones, and infertility is a common clinical manifestation of thyroid hormone deficiency in adult males. There is evidence that thyroid hormones have important functions on Leydig cells in the postnatal testis, including testosterone production. Thyroid hormones may also stimulate testosterone production by varying the pituitary's responsiveness to LH. Today, several currently used pesticides, especially those having endocrine disruptive properties, are known to impair reproductive competence of males. However, sexual and reproductive function in man is the result of neuroendocrine mechanisms involving hypothalamic, pituitary and gonadal hormones.

### Conclusion

Pesticides can exert disturbing actions on reproductive parameters of male farmers exposed to a wide range of pesticides probably with different mechanisms.

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## PFP-008

## Growth Inhibition of Pathogenic Bacteria Assessed in Vitro and in Food System Using Plant Essential Oils

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The use of plant essential oils (EOs) as natural antimicrobials for food preservation (biopreservatives) is of great interest due to consumer demand of natural food products and a growing concern of microbial resistance towards conventional preservatives. Thyme and mentha are plants well known for their good proprieties and are in abundance in North Algeria. This study aimed to assess the antibacterial activity of EOs from *Thymus vulgaris*, *Thymus satureioides*, *Mentha piperita*, and *Mentha spicata* in laboratory media and in beef minced meat as food system. The inhibitory effect of EOs on *Staphylococcus aureus*, *Bacillus cereus*, and *Escherichia coli* was evaluated by agar diffusion method and dilution assay. The efficiency of EOs was then assessed in food system by calculating CFU in stored (refrigerated) minced beef meat inoculated with pathogens. Overall results showed the inhibitory effect of thyme and mentha EOs on all bacteria tested in Muller Hinton media. Indeed, *S. aureus* and *B. cereus* exhibited high growth inhibition when treated by *Thymus vulgaris*. The addition of EOs to inoculated minced beef resulted in decrease of *S. aureus*, *B. cereus* and *E. coli* population after 4 days of storage at 4±2 °C compared to the control (meat without EO). Moreover, no significant alteration of flavor and taste was revealed in treated meat by sensory test. These findings suggested the possibility of using of thyme and mentha EOs as natural preservatives in meat and meat products preservation.

**1. Introduction**

Microorganisms, including Gram positive and Gram negative bacteria, have been recognised as an important cause of foodborne diseases and food spoilage. They were reported to generate a wide economic and public health impact worldwide (Dimitrijevic et al. 2007). The control of microbial contamination has been a major concern in the meat industry since pathogenic and spoilage-related bacteria have been found in refrigerated meat and meat products (Dhanze et al. 2013; Fernández-Pan et al. 2013). For example, *E. coli* O157:H7 is a food-related pathogen growing in low temperature and acidic conditions (Shah et al. 2012). This pathogen causes infection resulting in hemorrhagic uremic colitis and hemorrhagic uremic syndrome (Getty et al. 1999). Another foodborne pathogen *Salmonella typhimurium*, growing in a broad range of temperatures, was shown to cause systemic diseases that are associated with raw and cooked meats (Buchanan and Whiting 1998; Chen et al. 2013). In order to prevent bacterial activity antimicrobial agents especially of synthetic origin are added to the fresh meat and meat products. However, the addition of synthetic chemicals in these foods to extend the refrigerated storage time has raised a safety problem resulting in the preferential use of natural products as biopreservatives (Owen & Palombo 2007). Indeed, there is a worldwide trend to explore new alternatives to control foodborne diseases, giving priority to methods that reduce disease incidence and avoid negative and side effects on human health (Nedorostova, 2009). One of the most promising methods to control the microbial activity in foods seems to be the use of food grade phytochemicals. The plant extracts serve as a source of antimicrobial agents, and are currently used in food preservation (Burt, 2004). Therefore, essential oils which often contain major flavoring and bioactive components of herbs may have great potential use as food flavors and preservatives. Thyme and mentha (or mint) are aromatic plants of the Labiateae and Lamiaceae family respectively, which have been long used in foods for culinary purposes. Their essential oils were found to have antioxidant and antimicrobial properties (Rota et al. 2008; Desai et al. 2012). The antimicrobial activity of essential oils has been extensively studied and demonstrated in vitro against a number of microorganisms, usually using a direct-contact antimicrobial assays, such as diffusion or dilution methods. However, there has been very little scientific evidence to support their antibacterial effect in food systems. On the other hand, previous studies on antibacterial activity of plant extract or other antimicrobials have focused on referenced or laboratory-adapted species such as *E. coli* O157:H7, *Staphylococcus aureus*, *Listeria monocytogenes*, *Salmonella Typhimurium* DT104, etc or a limited number of pathogenic isolates (Burt & Reinders 2003; Oussalah et al. 2006; Shah et al. 2013). In addition, the results reported in literature about the susceptibility of bacteria to antimicrobials may not be reproducible in other countries depending on potential differences in bacterial and epidemiologic characteristics (Lamoth et al. 2010). Thus, the use of isolates from patients as bacterial model should provide a more accurate account of which features may be associated with colonization and disease associated. The aim of the current work was, as a first step, to investigate the antimicrobial activity of the essential oils of local thyme and mentha by disc diffusion and dilution methods against several pathogens. In a second step, we examined the antimicrobial activity of two selected samples of essential oils, which possessed high antibacterial effect and are more available locally, against *Escherichia coli*, *Staphylococcus aureus* and *Bacillus cereus* in food system using minced meat.

**2. Material and Methods****2.1. Plant material and essential oils extraction**

Four essential oils from *Thymus vulgaris*, *Thymus satureioides*, *Mentha spicata*, and *Mentha piperita*, were experimented. Fresh *M. spicata* material was collected from Kabylia area (North Algeria) during the vegetation period, botanically identified and immediately processed. While, *M. piperita* essential oil was provided by SAIDAL laboratory (SAIDAL group, Algiers, Algeria), it was extracted from local mentha by steam distillation. *Thymus vulgaris* was extracted from thymus material purchased from herbs store at Algiers. For comparative investigations of antibacterial activity of essential oils, a commercial essential oil, *Thymus satureioides* (PHYTOSUN aroms, Omega Pharma, France) was purchased from France to be used as reference. leaves and the flowered celebrities of mentha and the whole plant of thyme were washed with distilled water then dried in the shade during 3 day. *M. spicata* essential oil was isolated by distillation-extraction. An adequate quantity of air-dried mentha was chopped and placed in a flask where distilled water was also added (approximately 600 ml water in a 1 L flask for a 100 g sample), and subjected to a continuous hydrodistillation in a Clevenger-type apparatus for 3 h, up to the point at which the oil contained in the herbaceous matrix was exhausted. The obtained extract was mixed with ether and

sodium chloride, and then the mix was subjected to decantation for 24 hours at low temperature (approximately 4°C) to separate the essential oil from water. The ether in the extract was evaporated by vacuum rotary evaporator. Collected essential oil was dried over anhydrous sodium sulphate and stored in dark glass bottles at 4 °C until use. *T. vulgaris* and *M. piperita* essential oils were isolated from 5 kg vegetal material by hydrodistillation using a pilot hydrodistillation apparatus.

## 2.2. Antimicrobial activity assessment

### 2.2.1. In vitro study

The antimicrobial activity of essential oils was evaluated using three human isolates, *Escherichia coli*, *Staphylococcus aureus* and *Bacillus cereus*. These isolates were provided by Nedir Mohamed hospital (CHU, Tizi Wezzu, Algeria) where they were obtained from clinical specimens using conservative bacteriological methods. The preparation of the investigated bacteria suspensions was performed using Brain–Heart Infusion Broth (BHI, OXOID, Basingstoke, UK). After inoculation from the stock culture, the cultures were grown at 37 °C to stationary phase (24 h) in BHI Broth. These cultures were then used to inoculate the final media adjusting the concentration of 10<sup>5</sup> CFU/ml by a standard optical density (620 nm) of 0.5.

Antibacterial activity assays of essential oils were carried out using a laboratory media, Mueller Hinton agar (Becton Dickinson), and a food system, minced meat. Each assay was performed twice in duplicate. Antibacterial activity investigation on Mueller Hinton agar was performed by disc diffusion and MIC (Minimum inhibitory concentration) methods according to the method described by De Billerbeck (2007), but slightly modified. In the disc diffusion method, Mueller-Hinton agar (15 ml), sterilized in a flask and cooled to 45–50 °C, was distributed to sterilized Petri dishes. The media was then inoculated individually by 1 ml of prepared bacterial suspension containing 10<sup>5</sup> /ml. The filter paper discs (6 mm in diameter, Whatman No. 1) were individually impregnated with 5 µl of the whole essential oil extract, which was subsequently placed aseptically on the surface of the inoculated Petri dishes. The Petri dishes were kept for 2 h for drying, and then incubated at 37° C for 24 h. The diameters of the inhibition zones around the discs were measured in millimetres. Negative control was set up with equivalent quantity of distilled water. The sensitivity to the different oils was classified by the diameter of the inhibition halos as: not sensitive for diameters less than 8 mm; sensitive for diameters 9-14 mm; very sensitive for diameters 15-19 mm and extremely sensitive for diameters larger than 20 mm (Ponce et al. 2003).

MIC method was performed using standard dilution method. Serial dilutions of the different oils were prepared with essential oils to obtain the desired concentrations (75-70-60-50-25-20-10-5-3.3-2.5-2-1.6-1.25-1.1-1-0.9%) and kept at the room temperature prior to the experiments. 1 ml aliquot of the serial oil dilutions was mixed with 3 ml melted Mueller-Hinton agar, and then the mix was poured onto a Petri dish containing 20 ml of the same media and allowed to solidify (approximately 15 min). The respective Petri dishes containing diluted amounts of essential oil were inoculated with targeted bacteria using three spots of 1 µl of actively dividing bacterial cells (10<sup>5</sup> CFU/ml) for each Petri-dish. The positive control consisted of Muller Hinton Media inoculated with the same amount of cells but without any essential oil, while uninoculated plates containing the essential oil served as negative control. The cultures were incubated for 24 h at 37°C. Petri-dishes were evaluated for the presence or the absence of colonies after 24 hours of incubation. The MIC was defined as the lowest concentration required to stop the growth of bacteria at the end of 24 h of incubation.

### 2.2.2. Food model assay

Meat is recognized as one of the most perishable foods supporting pathogen and/or spoilage related bacteria, due to its high water and nutrients content. In order to evaluate the efficacy of three essential oils: *T. vulgaris*, *T. saturoioides*, *M. piperita* in food system, their antibacterial activity against bacteria selected for their high sensitivity to essential oils tested in vitro: *E. coli*, *S. aureus*, *B. cereus* was assessed in contaminated minced beef used as food model as described by Oussalah et al. (2006), and Solomakos et al. (2008), but with some modifications. Major muscles were obtained from fresh beef carcasses in a local abattoir, and transported to the laboratory under refrigerated conditions within 30 min. The meat was minced using a steel meat grinder, and minced meat was weighed and divided manually using gloves into individual samples (150g). The samples were inoculated by a targeted pathogen grown overnight at 37°C (with adjusted concentration of 10<sup>5</sup> CFU/ml) and added by an essential oil at a final concentration of 40 µl/100 g.

Treatment of the samples with essential oils at this concentration was examined for its effect on organoleptic properties of treated meat, because preliminary experiments showed that use of high concentration of essential oils provided unacceptable organoleptic properties in minced meat. To ensure proper distribution of the pathogen and essential oil, the treated samples were further homogenized mixing them manually for few minutes in aseptic conditions. Inoculated minced meat without essential oil was used as control. Samples from all treatments and controls were wrapped and stored under aerobic conditions at 4±2 °C for seven days. Enumeration of bacterial population of each sample was performed at day 1, 4 and 7 of refrigerated storage. Microbiological analysis was performed in duplicate and or triplicate.

### 2.2.3. Statistical analysis

The statistical package StatBox for Windows was used to explore the statistical significance of the results obtained. Analysis of variance was carried out on the results of microbiological analyses with the aim to verify the existence of statistically significant difference between the different treated minced meats throughout the storage period. A probability level of P < 0.05 was used in testing the statistical significance of experimental data.

## 3. Results and Discussion

### 3.1. In vitro antimicrobial activity

According to the literature, the antimicrobial activities of natural compounds in laboratory media are relatively different from those observed in food system because food ingredients can have an influence on the in situ activities of antimicrobials (Juven et al. 1994; Pol et al. 2001; Pendleton et al. 2012). In this study, pathogenic Gram positive and Gram negative bacteria were firstly challenged in vitro with mentha and thyme essential oils to evaluate their antibacterial properties. The zone inhibition diameters obtained with tested essential oils are listed in Table 1.

Table 1. Antimicrobial activities (mm of inhibition zone) of the *T. vulgaris*, *T. satureioides*, *M. piperita*, and *M. spicata* essential oils. Ø, diameter of zone of inhibition. Ø<8 mm, resistant; 9<Ø<14 mm, sensitive; 15<Ø<19 mm, highly sensitive; Ø>20 mm, extremely sensitive.

	Ø, mm of inhibition zone			
	<i>T. vulgaris</i>	<i>T. satureioides</i>	<i>M. piperi</i>	<i>M. spicata</i>
<i>S. aureus</i>	42	16	24,74	11
<i>B. cereus</i>	40,7	19	9,43	10,5
<i>E. coli</i>	21	14,25	9,88	9,05

All pathogens tested were sensitive (diameter of inhibition zone superior to 8 mm) to both thyme and mentha essential oils. The sensitivity to *T. vulgaris* was in the following order: *S. aureus* > *B. cereus* > *E. coli*, while the sensitivity order to *M. piperita* was *S. aureus* > *E. coli* > *B. cereus*. However, the bacterial species tested were found to be more sensitive to thyme than mentha essential oil. Whatever the essential oil used the Gram positive bacteria *S. aureus* and *B. cereus* appeared to be more sensitive to essential oils than Gram negative bacteria *E. coli*. Indeed, high growth inhibition was obtained by *T. vulgaris* tested against *S. aureus* (diameter: 42 mm) and *B. cereus* (diameter: 40,7 mm). In addition, essential oils from *T. vulgaris* showed low MICs (Table 2) compared to those from *M. spicata*, respectively 1% and 5 % (v/v) against *S. aureus*, *B. cereus*, *E. coli*.

Table 2. Minimal inhibitory concentrations (MIC) values of *T. vulgaris*, *T. satureioides*, *M. piperita*, and *M. spicata* essential oils.

Organism	MIC (%)			
	<i>T. vulgaris</i>	<i>T. satureioides</i>	<i>M. piperita</i>	<i>M. spicata</i>
<i>S. aureus</i>	1	1,1	2,5	5
<i>B. cereus</i>	1	1,1	ND	5
<i>E. coli</i>	1	1,25	ND	5

Results obtained are in accordance with those reported by Nedorostova et al. (2009) demonstrating that *T. vulgaris* essential oils were active against several Gram positive and Gram negative bacteria except *P. aeruginosa*. It has been suggested that the lipopolysaccharide covering of the outer membrane may restrict diffusion of hydrophobic compounds through the cell wall of Gram-negative bacteria (Davidson and Branen 2005). Mahboubi and Haghi (2008) mentioned that a significant activity against Gram-positive bacteria especially *S. aureus* was obtained by *Mentha pulegium* L. essential oil, whereas the least susceptible were Gram-negative bacteria especially *Escherichia coli*. The data showed that Gram-positive bacteria were more sensitive than Gram negative ones to essential oils tested.

These results could be explained by the difference in chemical composition (percentage of bioactive component) between the two essential oils. Previous antimicrobial activity studies on various thyme and mentha species from different localities showed inhibitory activity against a human, animal and plant pathogens, including food poisoning bacteria (Solomakos et al. 2008; Nedorostova et al. 2009, Djenane et al. 2012). The essential oils were reported to be hydrophobic components that accumulate in the lipid bilayer (cytoplasmic membrane) resulting in disruption of the bacterial membrane structure and function. The membrane functions as a barrier and as a matrix for enzymes and as an energy transducer are then compromised (Sikkema et al. 1994; Cristiani et al. 2007). Loss of integrity and leakage of cellular material such as ions, ATP and nucleic acid were reported as result of the extent of membrane damage induced by bioactive components of essential oils (Lambert et al. 2001; Trombetta et al. 2005). Our results were in agreement with those reported by Mahboubi and Haghi (2008) who showed that *Mentha pulegium* L. essential oil had inhibitory or germicidal effect depending on the type of organisms and revealed significant antimicrobial activity against Gram-positive bacteria.

### 3.2. Antimicrobial activity in food system

The antibacterial efficacy of thyme and mentha in minced beef meat was examined, since pertinent results in Muller Hinton media showed a strong antibacterial activity against the examined pathogen. Oils from *T. vulgaris*, *T. satureioides*, and *M. piperita* were tested against sensitive bacteria. Before EOs antimicrobial activity investigation, the minced meat was subjected to sensory test to evaluate the sensory color, odor and overall acceptability attributes of minced beef meat treated with essential oils. The optimal concentration of essential oils that did not affect the organoleptic properties of the product was 40 µl/100 g (other data not shown). The results of *S. aureus* growth evaluation in minced meat treated with essential oils are shown in Figure 1.

The obtained results showed that the addition of *T. vulgaris*, *T. satureioides*, and *M. piperita* in minced beef samples resulted in populations of *S. aureus* significantly lower ( $P < 0.05$ ) than in the control, throughout four days storage at  $4 \pm 2$  °C. However, the populations of the pathogen, after an initial decrease (storage day 4), from  $5,6 \pm 0,212$  (control) to  $4,2 \pm 0,3$  (*T. vulgaris*),  $4,6 \pm 0,1$  (*T. satureioides*) or  $4,8 \pm 0,1$  log CFU/ml (*M. piperita*) were slightly increased ( $P < 0.05$ ) at the seven day of refrigerated storage. In addition, the activity of *T. vulgaris* essential oil seemed to be more efficient against *S. aureus* as compared to those obtained by *M. piperita*, and *T. satureioides*. Same inhibitory effects were observed with thyme essential oils against *B. cereus* (Figure 2). Indeed, final populations of *B. cereus* in minced meat were significantly ( $P < 0.05$ ) lower in minced meat treated with *T. vulgaris* ( $4,4 \pm 0,3$ ) and *T. satureioides* ( $5 \pm 0,2$ ) than those of the control ( $5,7 \pm 0,1$  CFU/g) after seven days of refrigerated storage. *T. vulgaris* was more active against *B. cereus* as well against *S. aureus*.

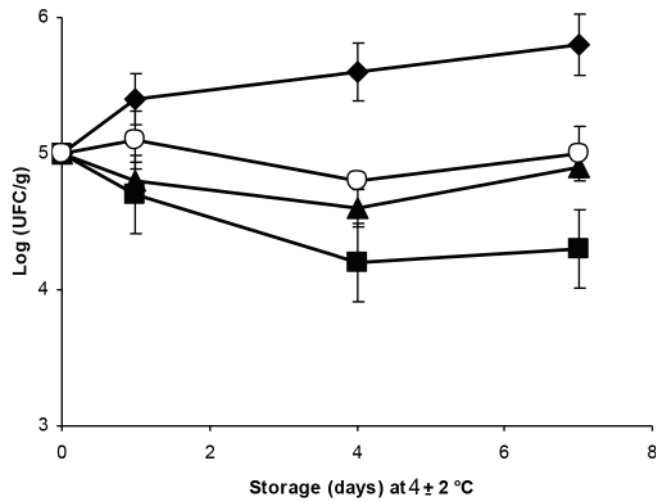


Fig. 1. Inhibition of *S. aureus* growth in minced beef treated by (■) *T. vulgaris*, (▲) *T. saturoioides*, and (○) *M. piperita* essential oils during refrigerated storage. Controls (◆) were contaminated minced meat without any essential oil. All meat samples were stored at the same temperature (4±2 °C).

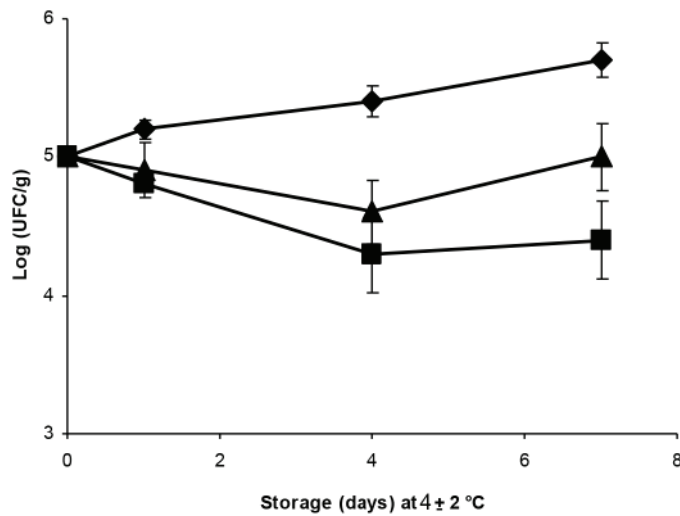


Fig. 2. Inhibition of *B. cereus* growth in minced beef treated by (■) *T. vulgaris*, and (▲) *T. saturoioides* essential oils. Controls (◆) were contaminated minced meat without any essential oil. All meat samples were stored at the same temperature (4±2 °C).

Regarding to the inhibitory effects of essential oils against the Gram negative bacterium *E. coli*, the results (Figure 3) demonstrated that the bacterial growth in minced meat treated with both *T. vulgaris* and *T. saturoioides* was significantly inhibited ( $P < 0.05$ ), resulting respectively in final *E. coli* population of  $4,5 \pm 0,1$  and  $5 \pm 0,2$  as compared to the control ( $5,7 \pm 0,071$  log /ml) after seven days of storage at  $4 \pm 2$  °C. The *T. vulgaris* essential oils were shown significantly ( $P < 0.05$ ) more inhibitory against *E. coli* than those of *T. saturoioides*.

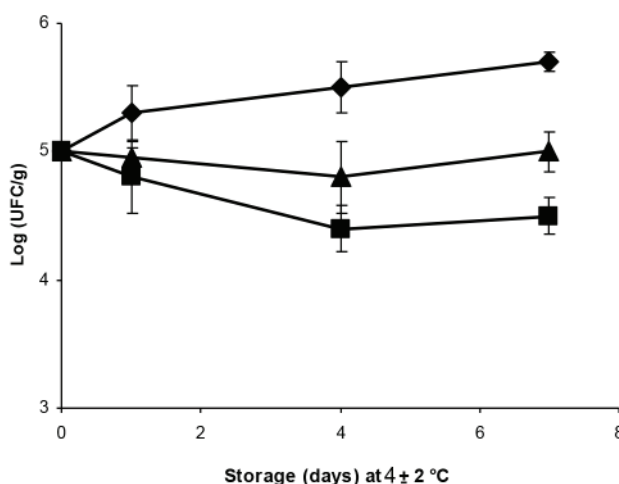


Fig.3. Inhibition of *E. coli* growth in minced beef treated by (■) *T. vulgaris*, and (▲) *T. satureioides* essential oils. Controls (◆) were contaminated minced meat without any essential oil. All meat samples were stored at the same temperature ( $4\pm 2$  °C).

The efficacy of essential oils in minced beef was different (less efficient) compared to laboratory media model due to the impact of food system composition on antimicrobial activity. The antibacterial properties of the essential oils are generally weakened when added to foods due to reaction of their bioactive molecules with food components (Helander et al. 1998; Shah et al. 2013). These results revealed probably the difference in antibacterial activity of oil components such as carvacrol and thymol reported to be major and active components of thyme (Cristiani et al. 2007). Some previous studies performed on the antimicrobial activity of carvacrol have shown that it has a broad spectrum of antimicrobial activity against both Gram-positive and Gram negative bacteria (Friedman and Mandrell 2002). Carvacrol (phenolic compound) was found to inhibit potentially the bacterial growth, owing to its high abundance in some oils, and high specific activity as compared to other essentials oils components (Dorman and Deans 2000).

Furthermore, the antimicrobial activity of thyme essential against foodborne pathogens such as *E. coli* O157:H7 oils could be enhanced in vitro (Burt and Reinders 2003) or foods (Hao et al. 1998) at temperatures higher than those of refrigeration. Recently, a study by Solomakos et al. (2008) demonstrated that treatment of beef meat with thyme essential oils at 0.6% had an inhibitory activity against *E. coli* O157:H7 at 10 °C.

#### 4. Conclusion

The findings of the current study highlight the promising antibacterial activity of thyme and mentha essential oils as natural antibacterial agents. The data showed that Gram-positive bacteria were more sensitive than Gram negative ones to essential oils tested. Indeed, both essential oils exerted in vitro inhibitory effects on all pathogens tested. However the efficacy of essential oils in minced beef meat was different compared to laboratory media model due to the impact of food system composition on antimicrobial activity. The results suggested that addition of essential oils at the level no affecting the organoleptic proprieties of the product exerted an inhibitory effect on microbial growth of minced meat during refrigerated storage. *T. vulgaris* was shown to have the best protective effect, keeping the microbial load change to acceptable levels in the first 7 days of refrigerated storage. Considering the increasing consumer demand in food added with natural agents these findings suggest the use of thyme or mentha oil as antibacterial agent in meat preservation.

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## PFP-009

## Ecotoxicological Assessment of the Impact of Effluent from the Sewage Treatment of the Skikda Petrochemical Complex (North-Eastern/Algeria)

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### Abstract

Our study carried on the assessment of the impact of effluent from the sewages treatment of the Skikda petrochemical complex on the marine environment with the help of bio tests on mollusk bivalves, the mussel *Mytilus galloprovincialis*. Notably by the dosage of the copper, zinc, manganese, iron and the cadmium for the sewages of the step, as well as the dosage of the same metals heavy bio accumulated by the molds. The results of analysis gotten, allowed us to put in evidence of the focusing raised of these elements, passing the values limits fixed by the regulation in force (Algerian) from afar.

### 1. Introduction

The complex petrochemical (of plastic matters) of Skikda of water pollution seriousness problems following the bad working of the sections of prétraitement (upstream), disrupting the bacteriological treatment. This last is very sensitive to the toxic elements generated by the units (as too alkali waters, heavy metals : Cu, Hg, etc.).

The impact of these substances on the environment is complex, so much their toxic actions can be direct or indirect on the individuals, the populations or the ecosystems (Nakhlé., 2003). Some authors (Philips., 1980 ; Waldichuck. M. 1985) propose that only, the measure of the concentration of the contaminating in the organisms, can inform on the real biodisponibilité. It is the principle of the use of the bio-indicatory quantitative, used in this survey.

### 2. Methodology

#### 2.1. Research Goal

In this survey we aim to identify the mediating effect of learning orientation on the relationship between leadership style and firm performance. To test the propositions, a field survey using questionnaires was conducted.

#### 2.2. Sample and Data Collection

The samples of molds are appropriated in a zone moved away of all source of industrial pollution and are divided in two shares: the first (share of reference) is destined to the dosage of the heavy metals to the level of their chair; the second (transplant) is maintained living, placed in a net transplanted to the level of the step of the complex petrochemical and controlled during one month before being analyzed.

To the laboratory, with the help of a knife made of steel, the edible parts of the shells of the 2 groups of molds are extracted and are ground dried then in the oven to a temperature of 80°C during 48 hours. A second grinding of the samples permits to get a dry powder, homogenized with the help of a mortar before being analyzed

#### 2.3. Analyses and Results

A minéralisation of the samples is made under pressure led by waves (technique of extraction to the micro waves Speedwave MWS2). After 25mn, the digestion is made and the dosage of metals is done by atomic absorption spectrophotometry to flame type Shimadzu AA6800, the one of the cadmium has been done at the oven graphite (GF-AAS).

An elevation of the concentration of the Cd for the transplanted share (0.74 .g /g) compared to the one of the reference share (0.01 .g /g) is detected (fig.1). The middle concentration recorded for the transplanted share passes the median value corresponding in the Cd (0.62.g /g) for the molds *Mytilus galloprovincialis*, on the set of the French coasts (IFREMER in Hadj Moussa., 2009). It indicates a failing of the station of purification (step) in relation to the Cd.

The concentrations for the two shares are however in conformity with the norm fixed by the OMS (OMS. IPCS., 1998). In the case of the copper, its concentration is raised more for the transplanted share and the concentration of the two shares is not compliant with the median value corresponding in the Cu (6.3.g /g) on the set of the coasts of France for *Mytilus galloprovincialis*. The same observations are noted for zinc. While taking into account the short length of exhibition of the transplant, we deduct that the basin of the step is very charged of these two elements.

The comparison of the results gotten during our survey with those of different authors (Table 1) permits to note that our contents are the most elevated for all considered metals, what could explain itself by a load of this important enough elements in the waters of the dismissal.

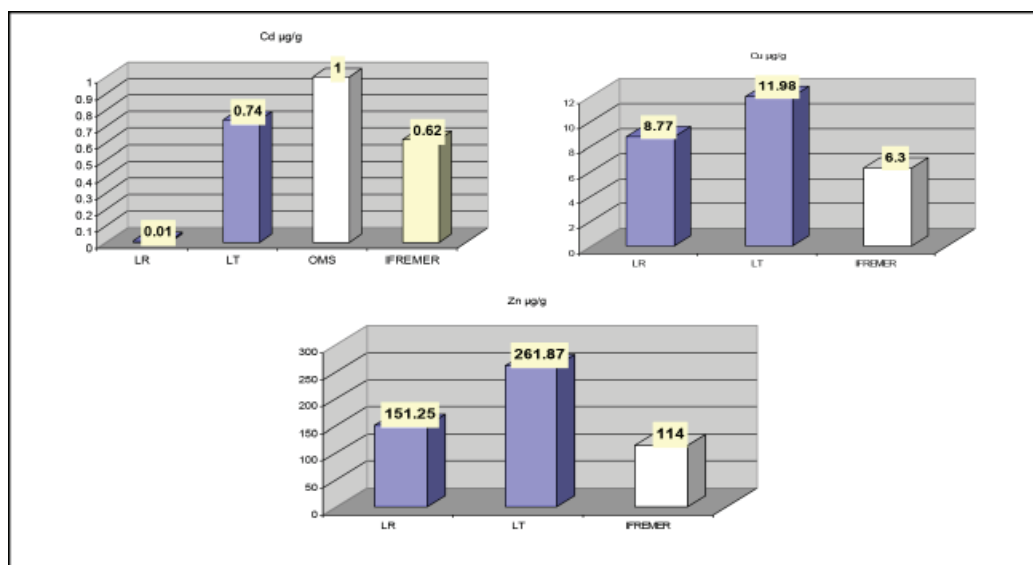


Fig. 1. Spatiale variation of the averages of heavy metals (LR: Lot of reference, LT: Lot transplanted)

Table 1. Comparison of the metallic concentrations of the mussel coming from different regions.

Authors	Species	origin	Fe (mg/kg)	Zn (mg/kg)	Cu (mg/kg)	Cd (mg/kg)
Tahri., 2005	<i>Mytilus galloprovincialis</i>	Bouregreg (Moroco)	389	225	8.77	0.48
Belabed., 2006	<i>Perna perna</i>	Amirouche (Algiers bay)	-	243	10.9	0.54
Hadj Moussa., 2009	<i>Perna perna</i>	Gulf of Annaba	-	171	5.34	0.64
Present servery	<i>Mytilus galloprovincialis</i>	Skikda Petrochemical Complex (dismissal)	525.51	261.87	11.98	0.74
IFREMER (in HadjMoussa 2009)	<i>Mytilus sp</i>	Coasts of France	-	114	6.3	0.62

### 3. Conclusion

This survey indicates that the sewages rejected by the step of the complex petrochemical are contaminated highly and have a negative impact on the middle. Being given the short length of our experimentation, *M.galloprovincialis* is not able to bio to accumulate the metallic pollutants to 100%; it will be necessary to wait therefore for several years so that the temporal set is consequent and achieve statistics permitting to value a possible tendency of these contaminating.

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INNOVATION AND ENTREPRENEURSHIP**

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---

**INDEX**

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---

<b>A</b>			
Aajdari, J.	OP-349	Ait Mokhtar, K.	PP-101
Ab Aziz, N. S.	OP-169, PP-060	Ajdari, J.	OP-229, OP-346, OP-350
Ab Ghani, M. R.	OP-117	Ajdari, J. A.	OP-476
Ab Halim, A. H.	OP-231	Ajdari, J. E.	OP-479
Ab Rashid, A. H.	OP-533	Aka, S. P.	OP-550
Ab. Jalil, Z. B.	OP-344	Akar, A.	PP-023, PP-098
Ab. Rahman, A.	OP-532	Akay, D.	OP-322
Abaci, N.	PP-071	Akbal Dağistan, Ö.	PP-069
Abaylı, D.	OP-323	Akbal, Ö.	PP-085
Abbasof, A.	PP-052	Akbas, M. Y.	OP-524
Abbaszadeh, M.	OP-226	Akbaş, H. Z.	OP-575, PP-030
Abd Ghani, M. K.	OP-471	Akcam, B.	OP-219
Abd Halim, M. S.	OP-456	Akcam, B. K.	OP-028
Abd Hashib, S.	OP-411, OP-412	Akdemir, B.	OP-386
Abd Rahman, N.	OP-333, OP-394, OP-412	Akdemir, R.	PP-065, PP-066
Abd. Rahman, A. F. B.	OP-509	Akdoğan, M.	PP-080
Abd. Rahman, N. B.	OP-276, OP-509, OP-510	Akdöl, B.	OP-007
Abdelaziz, M.	OP-328, OP-330, PP-041, PP-042	Akgül, B. A.	PP-063
Abdelhafidi, A.	OP-308, PP-097, PP-099, OP-309	Akhawan, H. A. B.	OP-510
Abdelhakim, B.	PP-051	Akhisar, I.	OP-356, OP-355
Abdelhamid, D.	OP-473	Akın, A.	OP-363, OP-462, OP-560
Abdelhay, B.	OP-547	Akın, F.	OP-183
Abdelhey, C.	OP-473	Akın, Ü.	OP-363, OP-462, OP-560
Abdelkader, B.	OP-327, PP-096	Akıncı, G.	OP-040, OP-589
Abdennour, C.	PP-062	Akindoyo, E. O.	OP-490, OP-491, OP-495, OP-501
Abderrahim, B.	OP-328, PP-041	Akindoyo, J. O.	OP-490
Abdul Hamid, A. A. K.	OP-351	Akinpelu, A. A.	OP-273
Abdul Latif, A. A.	OP-379, OP-182	Akiş, E.	OP-439
Abdul Manaf, A. Y.	OP-533	Akjhrriji, L.	OP-270
Abdul Manaf, S. F.	OP-169, PP-060	Akkaya, M. A.	OP-468
Abdul Talib, S.	OP-390	Akören, A. N.	OP-134
Abdulbari, H. A.	OP-491, OP-495, OP-501, OP-490	Aksakal, O.	PP-064
Abdullah, N.	OP-326	Aksar, M.	OP-292
Abdullah, S. A.	OP-415	Aksu, B.	PP-081
Abdullah, S. M.	OP-318	Aktekin, E.	OP-057, OP-063, OP-087
Abisuga, A. O.	OP-273	Akyol, Ş.	OP-213, PP-104
Abo Serie, E. F.	OP-274, OP-455	Akyuz, E.	OP-262, OP-420
Abo Zahhad, M.	VP- 001	Akyuz, F.	PP-071
Abood, W. N.	PP-088	Akyuz, U.	PP-071
Abrar, A.	OP-300	Al Badawi, E. A.	OP-417
Abu Bakar, S.	OP-150, PP-039	Al Ezzy, A. I. A.	PP-072
Abu Shah, M. N.	OP-310	Al Ghamdi, A. S.	OP-417
Abu, N.	OP-533	Al Ghonamy, A. I.	OP-417
Acar Şeşen, B.	OP-399, PP-003	Al Hamali, R. M.	OP-417
Acar, S.	OP-574	Alam, J.	PP-015
Achachi, A.	PP-040	Alatee, A.	OP-270
Açıkgoz, H.	OP-114, OP-375	Albayrak, A.	OP-176
Adak, M.	OP-046	Aldossari, S.	OP-270
Affandi, R.	OP-117	Alexander Jok, V.	OP-116
Aff, S. K. N.	OP-393	Alexandrou, E.	OP-195
Ahadina, F.	OP-358, OP-538	Alhalabi, W.	PP-035
Ahmad, A.	OP-332	Alhaza, T.	OP-243
Ahmad, D. F. S.	OP-140	Alhusainan, Z.	OP-243
Ahmad, H.	OP-081	Alıcı, E. H.	PP-034
Ahmad, M.	OP-504	Ali, A.	VP- 001
Ahmad, M. F.	OP-570	Ali, H.	OP-330
Ahmad, M. F. B.	OP-132	Ali, Z. A.	OP-304, PP-100
Ahmad, Z.	OP-318, OP-379	Alias, N. H.	OP-320
Ahmed, A. A.	OP-095, OP-421	Alias, R. A.	OP-419
Ahmedova, S. I.	OP-033	Aliti, B.	OP-346
Ahsan, M. S.	OP-434	Aliyef, M.	PP-052
Aichouni, M. A.	OP-417	Alkan Olsson, İ.	OP-364
Aimeshov, Z.	OP-094	Alkan Olsson, J.	OP-364
Ait Messaoudene, N. L.	OP-417	Alkan, M.	OP-558
		Alkan, R. M.	OP-025

## INDEX

Alkan, Ü. B.	OP-125	Ayrancı, E.	OP-003, OP-037
Almutairi, L.	OP-270	Aytaç, A.	OP-283
Aloqeely, A.	OP-270	Aytekin, Ç.	OP-223
Alpkan, L.	OP-111	Aytuğ, S. M.	OP-442
Alsadoon, A.	OP-243	Azhari, N. A.	OP-199
Alsaif, K.	OP-243	Azhikhanov, N.	OP-094
Alsammahi, L.	PP-035	Aziz, R. A.	OP-198
Altan, E.	OP-149	Azizan, N. A.	OP-073
Altincekic Gurkaynak, T.	PP-061	Azlim, M.	OP-343
Altun, H.	OP-503, OP-585	Azzaz, M.	OP-537
Alvarado, M. P.	OP-109		
Alwi, H.	OP-393, OP-494	<b>B</b>	
Amer, A. S.	OP-493, OP-512, OP-520	Baali, B.	PP-057
Amin, M. R.	OP-021, OP-317	Baali, H.	PP-057
Amin, O.	VP- 001	Baba, M.	OP-573
Amini, A.	OP-058, OP-069	Babae, R.	VP- 004
Amir, A.	OP-390	Babaghayou, I. M.	PP-099
Amran, M.	OP-343	Babaghayou, M. I.	OP-308, PP-097, OP-309
Amrouche, T.	PP-083	Babakhanian, M.	OP-029
Anand, B.	OP-105	Babu, A.	OP-584
Anderson, D.	OP-316	Baday Yıldız, E.	OP-301
Anggraeni, A.	OP-366	Badur, S.	PP-071
Anjuma, W. A. I.	OP-494	Bahadır, E.	OP-571
Antonio, G. B.	PP-020	Bahar, R.	OP-578
Anuwattana, R.	OP-505, OP-511	Baharuddin, M. Y.	OP-326
Anyibuofu, K. A.	OP-099	Bahtiyar, N.	PP-065, PP-066
Arabacı, G.	PP-034	Baitche, M.	PP-018
Aracı, M.	OP-102, OP-460	Baitiche, M.	PP-017
Aras, G.	OP-210, PP-107	Bajwa, S. U.	OP-246
Aras, U.	OP-321	Bak, B.	OP-016
Arayesh, M. B.	OP-250, OP-257	Bakar, M. H. A.	OP-018
Ardil, C.	OP-480	Bakış, A.	OP-093
Arı, E. S.	OP-220	Bakir, C.	OP-470
Arıkan, Ç. M.	OP-339	Bal, B.	OP-465
Arifwido, S. D.	OP-174	Balandin, G.	OP-526
Arikboga, F. S.	OP-007	Balci, S.	OP-201
Arikboga, S.	OP-041	Balık, M.	OP-175
Armatlı Köroğlu, B.	OP-051, OP-052	Bali, A.	OP-242
Arshad, H.	OP-573	Balpetek, D.	OP-186
Arshad, M. F.	OP-096	Bangprasit, P.	OP-496
Arslan, G.	OP-097	Basir, I. M.	OP-059
Artır, R.	OP-124, OP-127	Başcı, E. S.	OP-025
Aslan, Ö. F.	OP-359	Batı, G. B.	OP-038
Aslan, T.	OP-407	Baydaş, E.	PP-107
Asrihapsari, A.	OP-254	Baydogan, N.	OP-323, OP-536, PP-104, OP-213, OP-307
Assauri, S.	OP-366		
Atar, A.	OP-296	Bayrak, T.	OP-079, OP-159, OP-219
Atayef, M.	PP-052	Bayrakdar, H.	PP-105
Ateş Güvel, E.	OP-206, PP-023	Bayrakdar, S.	OP-196, OP-429, OP-432
Atılğan, M. D.	OP-551	Bayram, G. N.	OP-298
Avcı, F.	PP-003	Bedir, E.	OP-202, OP-528
Avtonomov, P.	OP-154, OP-168, OP-392	Bednár, J.	OP-128
Awang, H.	OP-182, OP-188, OP-379, OP-416	Beghiel, A.	OP-207
Awe, S. A.	OP-269	Behforouz, B.	OP-513
Ayas, S.	OP-085	Bektaş, H.	OP-136
Aydemir, B.	PP-065, PP-066, PP-080	Bel Hadj Miled, K.	OP-258
Aydın, A. D.	OP-433	Belhadj, M. Z.	PP-037
Aydın, G. Ö.	OP-060	Ben Haj Farhat, K.	OP-203
Aydın, M.	OP-385	Ben Rejeb, J.	OP-197, OP-428
Aydın, U.	OP-444	Benachour, D.	PP-017
Aydın, Z.	OP-575, PP-030	Benaldjia, A.	PP-090
Aydın, A. D.	OP-228	Bénard Rocherullé, P.	OP-208
Aydın, M. A.	OP-112	Benatia, D.	PP-040
Aykanat, Z.	OP-438	Benazzoug, M.	OP-578
Ayodele, B. V.	OP-490, OP-491	Bengtson, A.	OP-101

## INDEX

- |                      |                        |                        |                                 |
|----------------------|------------------------|------------------------|---------------------------------|
| Benhamel, A.         | PP-049                 | Carpio, C. R.          | OP-109                          |
| Benhouria, A.        | PP-054                 | Castren, L. J.         | OP-275                          |
| Benlakehal, D.       | PP-095                 | Cazacu ( Bancu), A. M. | OP-137                          |
| Benlekhal, D.        | PP-093, PP-094         | Cebeci, İ.             | PP-010                          |
| Benli, B.            | OP-306                 | Celik, M.              | OP-262, OP-420                  |
| Benli, T.            | OP-500                 | Cetin, G.              | OP-175                          |
| Benslama, M.         | PP-091                 | Cetinkaya, C.          | OP-453                          |
| Besisik, F.          | PP-071                 | Cevher, E.             | PP-069, PP-081, PP-085          |
| Beyhan, B.           | OP-091, OP-482         | Chabira, S. F.         | OP-308, OP-309, PP-097, PP-099  |
| Bhaskar, K.          | OP-584                 | Chafia, T.             | PP-020                          |
| Bhuiyan, M. A. R.    | OP-198                 | Chaghi, A.             | OP-376                          |
| Bilge Ocak, S.       | OP-065, OP-210         | Chahed, L.             | PP-093, PP-094, PP-095          |
| Bilge, A. N.         | OP-329, OP-507         | Chaid, R.              | OP-391                          |
| Bilgili, E.          | OP-262                 | Chaiyapong, P.         | OP-497                          |
| Bilgili, L.          | OP-516                 | Chakhmane, A.          | OP-340                          |
| Bilgin, A.           | OP-173                 | Chanpla, M.            | OP-499                          |
| Bilgin, O.           | OP-190                 | Chavalparit, O.        | OP-496, OP-497, OP-498, OP-505, |
| Bilir, M. Z.         | OP-184                 |                        | OP-511                          |
| Bircan, İ.           | OP-076                 | Chay, T. C.            | OP-390                          |
| Birol, Ö. H.         | OP-426                 | Che Ku Mohd, C. K. N.  | OP-145                          |
| Bitek, G.            | OP-321                 | Che Radzi, N.          | OP-116                          |
| Bodoshov, A. U.      | OP-336                 | Cheikh, A.             | PP-043                          |
| Boğa, K.             | PP-022, PP-025         | Chekroud, Z.           | PP-086                          |
| Boğazpınar, H.       | OP-534                 | Chen, C. W.            | OP-559                          |
| Bordjiba, O.         | PP-091                 | Cherfa, H.             | PP-101                          |
| Bostancıoğlu, C.     | OP-233, OP-235, OP-266 | Cheriet, F.            | OP-153                          |
| Bouchetara, M.       | PP-049                 | Chetty, A.             | OP-247                          |
| Boudoukha, A.        | PP-037                 | Chin, Y. H.            | OP-362                          |
| Boufas, S.           | OP-208                 | Cho, N.                | OP-414                          |
| Bouglouf, M.         | PP-084                 | Chorfi Ouertani, H.    | OP-270, OP-313                  |
| Bougouffa, L.        | OP-376                 | Choudhury, M. A.       | OP-024                          |
| Bouguerra, N.        | OP-295                 | Ciftci, C.             | OP-372                          |
| Bouguezzi, F.        | OP-540                 | Ciftci, S.             | PP-071                          |
| Bouizem, Y.          | PP-095, PP-093, PP-094 | Cimenoglu, H.          | OP-536, PP-104                  |
| Bouker, M.           | OP-261                 | Cinemre, F. B.         | PP-065, PP-066, PP-080          |
| Bouker, S.           | PP-001                 | Cinemre, H.            | PP-065, PP-066, PP-080          |
| Bourenane, N.        | PP-092                 | Civelek, M. E.         | OP-049                          |
| Bousbahi, F.         | OP-313                 | Colakoglu, N.          | OP-122, OP-123                  |
| Boutahala, M.        | PP-019, PP-054         | Corelli, A.            | OP-156                          |
| Boydak Öztaş, B.     | OP-225                 | Coroiu, M. A.          | OP-384                          |
| Boydak Öztaş, Y. B.  | OP-017                 | Coskun, S.             | OP-227                          |
| Boydaş, E.           | OP-209                 | Coşkun, E.             | OP-027                          |
| Boydaş, M. G.        | OP-209                 | Cömert, E.             | OP-209                          |
| Bozdoğan, D.         | OP-161                 | Cumazade, Ş.           | PP-052                          |
| Bozkurt, Ö. Ö.       | OP-263                 |                        |                                 |
| Boztepe, H.          | OP-534, OP-566         | <b>Ç</b>               |                                 |
| Börklü, S. S.        | OP-363                 | Çağlıyor, S.           | OP-561                          |
| Brahmi, Y.           | PP-093, PP-094         | Çak, D.                | OP-592                          |
| Brickchaouche, S.    | OP-537                 | Çakıcı, F.             | OP-515, OP-518                  |
| Bulgan, G.           | OP-444                 | Çakır, F. H.           | OP-019, OP-185, OP-064, OP-492  |
| Bulut, Ç.            | OP-550                 | Çakmak, A.             | OP-173                          |
| Buyukokuroglu, M. E. | PP-065, PP-066         | Çalışkan, R.           | OP-066                          |
| Bülbül, I. A.        | OP-056                 | Çaplı, B.              | OP-477                          |
| Büyükyıldız, M.      | OP-337, PP-106         | Çatar, R. Ö.           | OP-567                          |
|                      |                        | Çekdemir, D.           | PP-080                          |
| <b>C</b>             |                        | Çelik, F.              | OP-251                          |
| C. R., N.            | OP-410                 | Çelik, O. N.           | OP-064, OP-492                  |
| Cakiris, A.          | PP-071                 | Çelikdin, A. E.        | VP- 002                         |
| Çalışkan Cavdar, S.  | OP-433, OP-228         | Çemberci, M.           | OP-049                          |
| Caliskan, N.         | OP-370                 | Çetin, A.              | PP-028                          |
| Canatan, H.          | OP-088, OP-368, OP-546 | Çetinkaya, M.          | OP-430                          |
| Canbolat, N.         | OP-049                 | Çinar, T.              | PP-061                          |
| Canbolat, S.         | OP-181, OP-204         | Çingil Barış, Ç.       | PP-006                          |
| Canbolat, Ş.         | OP-180, OP-183         | Çıta, K.               | OP-057                          |
| Canci Matur, U.      | OP-213, OP-213, PP-104 | Çıta, K.               | OP-087                          |

## INDEX

Çiflikli Kaya, C.	OP-006	Doğan, E.	OP-488
Çimen, H.	OP-385	Doğan, N.	OP-179
Çimenoğlu, H.	OP-213	Doğan, S.	OP-283
Çingitaş, Y.	OP-034	Doğrul, A.	OP-515, OP-518
Çizmeçi, İ. H.	PP-046	Donmez, O.	OP-339
Çoşgun, T.	OP-515, OP-516, OP-518	Dorantes Gonzalez, D. J.	OP-444
Çubuk, D.	OP-056	Doruk, Ö. T.	OP-591
Çubukcu, A.	OP-106	Döş, B.	OP-221
Çuvalcı, O.	OP-239, OP-240, OP-244, OP-377	Duhaime, F.	PP-101
<b>D</b>		Dulina, T.	PP-039
Dadameah, S. I.	OP-140, OP-544	Dulyapach, K.	OP-498
Dalbaş, E. S.	OP-155	Duman, Y.	OP-201
Danoun, K.	PP-083	Durgun, Ö.	OP-369
Danyal, Y.	OP-054	Durmaz, S.	OP-319
Daruis, D. D. I.	OP-059	Dündar, A.	OP-503
Darusmy, A.	OP-172	Dündar, Ö.	OP-066
Das, S.	OP-095, OP-421	Dvorsky, R.	OP-128
Daş, G. S.	OP-469	Dziri, F.	PP-083
Daud, R. B.	OP-344	<b>E</b>	
Daud, Z.	OP-182, OP-188, OP-379, OP-416	Ece, M. Ş.	PP-032
Dayan, O.	PP-029	Ecevit Satı, Z.	OP-034
Dayıoğlu, H.	OP-183, OP-204	Edibali, R.	OP-294
De La Hoz, S.	OP-521	Ejupi, S.	OP-166
Debnath, S. C.	OP-070	Ekerbiçer, H. Ç.	PP-080
Değerli, A.	OP-223, OP-357	Ekmekci, I.	OP-388
Değerli, B.	OP-223	El Habib, G. M.	OP-330
Değermen Erenkol, H. A.	OP-017	El Idrissi, H.	OP-340
Değermen, A. H.	OP-592	El Kechebour, B.	OP-241
Delmas, M.	OP-450	El Kolli, M.	PP-017
Demez, S.	OP-432	Elezi, M.	OP-237
Demir Uslu, Y.	OP-039	Elkaouachi, A.	OP-340
Demir, A.	OP-189	Elkordy, A.	VP- 006
Demir, E.	OP-039	Elsharif, M. A.	OP-512
Demir, K.	PP-071	Elumalai, G.	OP-119
Demir, K. A.	OP-486	Elumalai, G. G.	OP-143
Demir, K. A.	OP-588	Emekçi, F.	OP-265
Demir, Ö.	OP-481	Eniola, A. A.	OP-071
Demir, S.	OP-485	Ensari, T.	OP-264
Demirel, M.	PP-030	Entebang, H.	OP-071
Demirel, Ü.	OP-365	Entezari, Y.	OP-141
Demiren, F.	OP-149	Er, M.	OP-164
Demirkıran, S.	PP-004, PP-045	Erat, S.	OP-111
Demirtaş, İ.	OP-397, OP-413	Erbay, H.	OP-569
Dener, M.	OP-233, OP-235, OP-266	Erbıyık, H.	OP-278, OP-395, OP-423
Deniz, M.	OP-315	Erciş, A.	OP-031
Deniz, M. E.	OP-562	Erdal, E.	OP-569
Dereli, D. D.	OP-104	Erdal, L.	OP-042
Deros, B. M.	OP-059, OP-151	Erdal, M. S.	PP-082
Desa, M. A. M.	OP-018	Erden, B.	OP-359
Develi, B.	PP-056	Erdil, A.	OP-277, OP-278, OP-395
Dhar, M. S.	PP-068	Erdoğan, A.	OP-088, OP-368, OP-546
Dibra, M. X.	OP-178	Eren, Ö.	OP-589
Didier, V.	PP-016	Ergani, B.	OP-057
Dimin, M. F.	OP-129	Ergani, B.	OP-087
Dinçer, M. Z.	OP-012	Ergen, M.	OP-580
Dindaroğlu, Y.	OP-301, OP-465	Erisir, E.	OP-319
Dirican, A. C.	OP-478	Erkan, B.	OP-138
Dirican, C.	OP-435, OP-581	Ermolaeva, G.	OP-526
Djaalab, A.	OP-347	Eroğlu, H.	PP-064
Djebar, A. B.	PP-084	Erol, A.	OP-339
Djenane, D.	PP-083	Ersoy Yılmaz, A.	OP-113
Djeral, M.	PP-083	Ersoy, E.	OP-562
Dogan, T.	OP-307	Erşahin, G.	OP-380
Doğan, A. Ö.	OP-535	Ertaş, E.	PP-031, PP-033

## INDEX

- |                                  |                                |                                 |  |
|----------------------------------|--------------------------------|---------------------------------|--|
| Ertok, D. M.                     | OP-372                         | Güneş, A. E.                    | OP-459   |
| Ertok, M.                        | OP-030                         | Güneş, İ.                       | OP-067   |
| Ertuğrul, A.                     | OP-003, OP-037                 | Güneş, N.                       | OP-371, OP-595   |
| Ertuğrul, M.                     | OP-210                         | Güngör, S.                      | PP-082   |
| Ertürk, M.                       | OP-449, OP-541                 | Güngördük, S.                   | PP-082   |
| Eryarsoy, E.                     | OP-238, OP-459                 | Gür, B.                         | OP-534   |
| Eryiğit, N.                      | OP-142, OP-457                 | Gürcüm, B. H.                   | OP-184   |
| Eşiyok Sönmez, E.                | OP-401                         | Gürgen, S.                      | OP-019, OP-064, OP-185   |
| Eyupoglu, C.                     | OP-112, OP-181, OP-268, OP-272 | Gürol, G.                       | PP-065, PP-066   |
|                                  |                                | Gürsu, H.                       | OP-534   |
|                                  |                                | Güvel, E. A.                    | OP-126, OP-324, OP-325   |
|                                  |                                | Güven, E.                       | OP-118   |
| <b>F</b>                         |                                | <b>H</b>                        |  |
| Faraj, E. A.                     | OP-495                         | Hacıoğlu, V.                    | OP-427, OP-429   |
| Farrag, M.                       | VP- 001                        | Haddad, A.                      | OP-537   |
| Fatima, G.                       | PP-020                         | Haddadi, S.                     | OP-153   |
| Fatma Zahra, K.                  | PP-038                         | Hadi, A.                        | OP-310   |
| Ferati, M.                       | OP-350                         | Hadjikhani, A.                  | OP-101   |
| Fındık, D.                       | OP-091                         | Hadjila, D.                     | PP-016   |
| Fidan, T.                        | OP-158                         | Hafız, N.                       | PP-035   |
| Figueroa, W. E.                  | OP-109                         | Halıcıoğlu, F.                  | OP-004   |
| Filali, L.                       | PP-093                         | Hameed, B. H.                   | PP-054   |
| Filali, L.                       | PP-094                         | Hameed, S.                      | OP-382   |
| Fisher, J.                       | OP-418                         | Hamid, A.                       | OP-362   |
| Fouzia, Z.                       | PP-103                         | Hamida, B.                      | PP-050   |
| Frederico Fialho Teixeira, F. F. | OP-444                         | Hamzah, A. F.                   | OP-096   |
|                                  |                                | Hamzah, F.                      | PP-060   |
| <b>G</b>                         |                                | Hamzah(ph.d), M. I.             | OP-570   |
| Gadelmavla, D.                   | OP-097                         | Hanane, L.                      | PP-051   |
| Gareh, M.                        | PP-040                         | Hanbeyoğlu Yavaş, B.            | OP-306   |
| Geçibesler, İ. H.                | OP-397, OP-413, PP-028, PP-029 | Hancıoğlu, Y.                   | OP-039   |
| Gedik, Ş.                        | OP-008                         | Hanif, N. E.                    | OP-412   |
| Genciyef, A.                     | PP-052                         | Harun, S. W.                    | OP-508   |
| Gençler, A.                      | OP-437                         | Harzi, M.                       | OP-234   |
| Genç, M.                         | OP-014                         | Has, E.                         | OP-123   |
| Gençler, F.                      | OP-076                         | Has, L.                         | OP-122   |
| Gençoğlu, D.                     | OP-325                         | Hasan, A.                       | OP-157   |
| Geok Pheng, L.                   | OP-117                         | Hasan, M.                       | OP-314   |
| Ghan, C. K.                      | OP-117                         | Hasan, R. S.                    | OP-248   |
| Ghani, S. N. A.                  | OP-320                         | Hashim, R.                      | OP-005   |
| Ghemit, R.                       | PP-017                         | Hasibuan, R.                    | OP-172   |
| Ghemit, R.                       | PP-018                         | Hasnain, S. S.                  | OP-077   |
| Goc, G.                          | OP-201                         | Hassan, M. U.                   | OP-382   |
| Gok, O.                          | OP-048                         | Hassan, R. S.                   | OP-553   |
| Gomri, F.                        | PP-019                         | Hassina, Z. B.                  | PP-048   |
| Gozkaman, A.                     | OP-398                         | Haykır Hobikoğlu, E.            | OP-135, OP-193, OP-430,<br>OP-055, OP-165, OP-216,<br>OP-255, OP-353, OP-404, OP-545 |
| Gozukara, I.                     | OP-167                         |                                 |  |
| Göçer, İ.                        | OP-042                         | Hekim, H.                       | OP-028   |
| Gök, M. O.                       | OP-184                         | Helvacioğlu, A. D.              | OP-557   |
| Gökçe, K. D.                     | OP-253, OP-599                 | Hernandez Munoz, L.             | OP-058, OP-069   |
| Gözen, M. Ç.                     | OP-554                         | Herrero De Egaña Muñoz Cobo, B. | VP- 009  |
| Grazib, M.                       | OP-572                         | Hewing, M.                      | OP-586   |
| Guder, F.                        | OP-575                         | Hız, G.                         | OP-500   |
| Gueddah, D.                      | PP-062, PP-084                 | Hisham, S. F.                   | OP-533   |
| Guler, A.                        | OP-028                         | Hmida, L.                       | OP-211   |
| Gurbuz, U.                       | OP-186                         | Homchuen, K.                    | OP-505   |
| Gül, M.                          | OP-337                         | Hoque, M. A.                    | OP-023, OP-024   |
| Gülbahar, M. O.                  | OP-131                         | Horii, H.                       | OP-078   |
| Güler, M.                        | PP-044                         | Hossain, M. A.                  | OP-504   |
| Gülşen, G.                       | PP-047                         | Hözlle, K.                      | OP-586   |
| Gültekin, S. S.                  | OP-066                         | Husa, P. P.                     | OP-254   |
| Gülüm, M.                        | OP-173                         | Hwang, K.                       | OP-590   |
| Gümüş, B.                        | OP-106                         |                                 |  |
| Gümüşsoy, S.                     | OP-063                         | <b>I</b>                        |  |
| Güncü, A.                        | PP-055                         |                                 |  |
| Gündoğdu, A.                     | OP-594                         |                                 |  |
| Günel, O.                        | OP-549                         |                                 |  |



## INDEX

Ibrahim, B.	OP-081	Kamnungwut, W.	OP-461
Ibrahim, F. W.	OP-362	Kannarat, R.	OP-002
Ibrahim, M. B.	OP-132	Kaoplod, P.	OP-002
Ibrahim, U. K.	OP-411, OP-412	Kapila, P. F.	OP-489
Idris, S. S.	OP-333	Kaplan, Z.	OP-487
Idris, S. S. B.	OP-276, OP-509, OP-510	Kara, A.	PP-026
Idris, W. M. R.	OP-198	Karabulut, A. T.	OP-084, OP-108
Ifechukwudebelu, O. A.	OP-099	Karaca, C.	PP-071
Iğde, M.	OP-348	Karademir, H.	OP-135
Inci, E.	OP-265	Karaerkek, A. Ç.	PP-026
Ines, B. D.	PP-012	Karagoz, A.	OP-175
Intepe, G.	OP-381	Karahan, Ö.	OP-047
Irengun, O.	OP-041	Karakaş Geyik, S.	OP-315
Islam, M. R.	OP-504	Karaman Kabadurmus, F. N.	OP-448
Ismail, A.	OP-383	Karaman, E.	OP-118
Ismail, F.	OP-248, OP-326	Karamollaoglu, N.	OP-444
Ismail, K.	OP-333	Karaosmanoğlu, K.	OP-500
Ismail, K. N.	OP-310	Karapınar, H.	OP-118
Ismail, N.	OP-013	Karatas, A.	OP-557
Ismaili, F.	OP-346, OP-349, OP-350, OP-476	Karatas, R.	PP-008
Ispal, M. A.	OP-291	Karga, E.	OP-367
Istanbulu Dincer, F.	OP-175	Karlsson, H.	OP-053
Iyigun, N. O.	OP-089	Karmakar, S.	OP-095, OP-421
<b>İ</b>		Kartlak, H.	PP-046
İlleez, A. A.	OP-155	Kasim, S. H.	OP-533
İnce, E.	OP-341, OP-342	Kaur Ap Jujar Singh, H.	VP- 004
İskender, E.	OP-038, VP- 007	Kauranen, I. S.	OP-275
İsmayılof, N.	PP-052	Kavurucu, Y.	OP-264, OP-348
İspirli, M. M.	OP-113	Kaya, B.	OP-006
İstanbulu Dinçer, F.	OP-012	Kaya, N.	OP-060, OP-061, OP-062
İşler, R.	OP-303	Kaya, S.	OP-118
<b>J</b>		Kayacan, E.	OP-136
Jaafar, S.	OP-150	Kayalar, M.	OP-057
Jabar, J.	OP-441	Kayani, B. N.	OP-425
Jalani, N. H.	OP-163	Kayani, F. N.	OP-282
Jamaluddin, N.	OP-096	Kayani, U. N.	OP-593
Jamil, N. I.	OP-230	Kayani, Z. A.	OP-563
Januri, Z. B.	OP-509, OP-510	Kaymakoglu, S.	PP-071
Januzaj, Y.	OP-229	Kazan, H.	OP-193, OP-227, OP-545
Jarohnovich, N.	OP-090	Kazan, P. D. H.	OP-372
Jarwali, A.	OP-243	Kazaz, A.	OP-098
Jaya, R. P.	OP-096	Kebab, A.	PP-093, PP-094, PP-095
Jebreel, S. A.	OP-335	Keçecioglu, Ö. F.	OP-114, OP-375
Johan, K.	OP-160	Kemayel, L. M.	OP-011
Johari, F.	OP-144	Kerdpech, P.	OP-002
Junejo, F.	OP-382	Kerfouf, A.	PP-036
<b>K</b>		Kesici Çalışkan, H.	OP-436
K. H., K. H.	OP-410	Kesici, S.	OP-008
Kaadan, A.	OP-565	Keskin, F.	PP-071
Kabukcu, E.	OP-036	Keskin, G.	OP-063
Kacmaz, G.	PP-008	Ketkaew, C.	OP-002
Kadiu, F.	OP-370	Ketkaew, C.	OP-147
Kahraman, U. A.	OP-529	Khan, A.	OP-300
Kalaycioglu, H.	OP-321	Khan, S. H.	OP-314
Kalça, A.	OP-301, OP-465	Kharchi, F.	OP-391
Kalem, G.	OP-352	Khiari, M.	OP-428
Kalimasyada, D.	OP-358, OP-538	Khoja, M. E. B.	OP-418
Kalnins, J. R.	OP-090	Kılıç Aksu, P.	OP-567
Kama, O.	OP-487	Kılınç, M.	OP-180
Kamarudzaman, A. N.	OP-390	Kırbaşlar, F. G.	OP-341, OP-342, PP-003, PP-006, PP-007
Kamaşak, R.	OP-083	Kırık, H.	OP-364
Kamberi, L.	OP-148	Kismet, Y.	OP-531
		Kızılcan, N.	OP-125, OP-126, OP-206, OP-306, OP-324, OP-325, PP-023, PP-098

## INDEX

- |                      |                                |                            |  |
|----------------------|--------------------------------|----------------------------|--|
| Kilic, M. A.         | PP-065, PP-066                 | Lanez, M.                  | OP-242   |
| Kilinc, M.           | OP-181, OP-183                 | Larbi, Z.                  | PP-024   |
| Kilinc, U.           | OP-555                         | Lee, J.                    | PP-027, PP-058, PP-059, PP-073,<br>PP-074, PP-075, PP-076, PP-077,<br>PP-089, PP-102 |
| Kim, B.              | OP-243                         | Lee, S. O.                 | OP-539   |
| Kim, E.              | OP-078                         | Levet, A.                  | OP-337, PP-106   |
| Kim, J.              | OP-414                         | Lieskovská, V.             | PP-013, VP- 003, VP- 008   |
| Kim, N.              | OP-414                         | Lieskovsky, M.             | VP- 003  |
| Kim, S.              | PP-011                         | Lilia, Z.                  | PP-038   |
| Kiratisin, A.        | OP-162                         | Limanlı, Ö.                | OP-043   |
| Kiremit, R. F.       | OP-467                         | Lin, B.                    | OP-559   |
| Kiziler, A. R.       | PP-065                         | Lomen, M.                  | OP-418   |
| Kiziler, A. R.       | PP-066                         | Lounes, K.                 | OP-537   |
| Koc, M.              | OP-001                         | Lüle, F.                   | OP-409, OP-115   |
| Kocaalan, M. L.      | OP-120                         |                            |  |
| Kocakoç, M.          | OP-214, OP-215                 | <b>M</b>                   |  |
| Koç, S.              | OP-554                         | M.gunawan, M. F. B.        | OP-344   |
| Koç, T.              | OP-217                         | Mad Noh, N.                | OP-199   |
| Koç, T. V.           | OP-381                         | Mahdi, R.                  | OP-443   |
| Koçkan, I.           | PP-044                         | Mahmood, N. Z.             | OP-171   |
| Koksal, M.           | OP-388                         | Mahmut, M.                 | OP-478   |
| Konaklıoğlu, E.      | OP-296                         | Main, A.                   | OP-232   |
| Kongprasert, N.      | OP-177                         | Majeed, N. N.              | OP-360   |
| Korkmaz, H. C.       | OP-293, OP-519                 | Majid Niaz, A.             | PP-039   |
| Kornienko, V.        | OP-154, OP-168, OP-392         | Makhloufi, A.              | PP-017, PP-018   |
| Kostura, B.          | OP-128                         | Maksom, H. F.              | OP-389   |
| Kourdoumpalou, P.    | OP-445                         | Maktabi, H.                | OP-029, OP-249   |
| Koyuncu, T.          | OP-115, OP-409                 | Maldonado, D.              | OP-521   |
| Koyuncugil, A. S.    | OP-564                         | Malik, K.                  | OP-434   |
| Koyuncuoğlu, I.      | OP-173                         | Malik, M. S.               | OP-553   |
| Köken, N.            | OP-126, OP-305, OP-307, OP-325 | Malika, F.                 | PP-024   |
|                      | PP-021                         | Manoli, A.                 | OP-447   |
| Köksal, L.           | OP-567                         | Manolopoulou, E.           | OP-543   |
| Kökümer, T.          | OP-525                         | Manurung, R.               | OP-172   |
| Köprü, M.            | OP-065                         | Maqsood Ul Haque, S. N. S. | OP-187, OP-411, OP-412   |
| Köse, C.             | OP-406                         | Markatou, M.               | OP-010, OP-044, OP-195, OP-445,<br>OP-446, OP-447                                    |
| Köse, Z.             | OP-286                         |                            | OP-508, OP-508   |
| Krichen, S.          | OP-234                         | Markom, A. M.              | OP-267, OP-474, OP-475   |
| Kruja, A.            | OP-287                         | Maseleno, A.               | OP-577   |
| Ku Hamid, K. H.      | OP-116, OP-393, OP-494         | Masrom, A. K.              | OP-533   |
| Kubilay, I. A.       | OP-345                         | Mastor, A.                 | OP-456   |
| Kulamof, Y.          | PP-052                         | Mat Ali @ Salim, D. N. A.  | OP-248   |
| Kulmyrzaev, A. A.    | OP-387                         | Mat Dahan, S.              | OP-132   |
| Kumnungwut, W.       | OP-015                         | Mat Jiddin, K. B.          | OP-128   |
| Kunday, Ö.           | OP-026                         | Matysek, D.                | OP-276   |
| Kunday, Ö.           | OP-100                         | Matali, S. B.              | OP-171   |
| Kurniawan, R.        | OP-334                         | Maulina, S.                | OP-387   |
| Kurnuç, A.           | PP-055                         | Mazhitova, A. T.           | OP-577   |
| Kurt, S.             | OP-082, OP-284, OP-020, OP-245 | Md Jamil, F.               | OP-132   |
| Kurt, Ü.             | OP-082                         | Md.nasir, M. R. B.         | PP-013, VP- 003, VP- 008   |
| Kurtulus, C. O.      | OP-319                         | Megyesiova, S.             | OP-361, OP-454   |
| Kuruoğlu, F.         | OP-339                         | Mehdiyeva, Y.              | OP-139   |
| Kuşhan, M. C.        | OP-019, OP-064, OP-185         | Mehic, E.                  | PP-091   |
| Kut, D.              | OP-180, OP-181, OP-204         | Meraghni, M.               | OP-183, OP-204   |
| Kutbay, I.           | OP-200                         | Meric, İ.                  | OP-164   |
| Kuzucu Yapar, B.     | OP-196                         | Merida, A.                 | OP-391   |
| Küçer, N.            | OP-212                         | Mezedjri, L.               | PP-036, PP-090   |
| Küçer, R.            | OP-212                         | Milad, B.                  | OP-396   |
| Küçükaydın, H.       | OP-444                         | Millhiser, W. P.           | OP-597   |
| Küçükbay, S.         | OP-265                         | Miloud, B.                 | OP-328, PP-041, PP-042   |
| Kül, S.              | OP-190                         | Miman, M.                  | OP-008, OP-293, OP-367, OP-519   |
| Kweh, Q. L.          |                                | Mohamad Noh, Z. A.         | OP-231   |
|                      |                                | Mohamad Ridzuan, F. H.     | OP-231   |
| <b>L</b>             | OP-073                         |                            |  |
| Laiwattanapaisal, W. | PP-078, PP-079                 |                            |  |
| Lalaoui, L.          | OP-347                         |                            |  |

## INDEX

Mohamad, P. M.	OP-456	Nihed, D.	PP-048
Mohamad, S. N. M.	OP-199, OP-311	Nik Abd Aziz, N. M. A.	OP-576
Mohamadi, T.	OP-347	Nik Sulaiman, N. M.	OP-171
Mohamed Mounir, S.	OP-473	Nikolova, I.	OP-403
Mohamed, B.	PP-038	Noiphung, J.	PP-079
Mohamed, H.	PP-016	Noor Kamar, A. N.	OP-248
Mohamed, K.	PP-041	Noorsal, K.	OP-533
Mohamedi, N.	OP-208	Nouibat, A.	OP-466
Mohammad, M.	OP-570	Nuhiu, M.	OP-166
Mohammad, M. B.	OP-132	Nur Farhani, I.	PP-039
Mohammed, A. M.	OP-530	Nutku, F.	OP-339
Mohd Alwi, N. H.	OP-231		
Mohd Fadzley, R.	PP-039	<b>O</b>	
Mohd Harta, M. Z.	OP-182, OP-188	O.k Rahmat, R. A.	OP-383
Mohd Ibrahim, S.	OP-577	Odabaşı, E.	PP-107
Mohd Isha, K.	OP-576	Ogut, S.	PP-066
Mohd Kassim, A. S.	OP-182	Ohshima, N.	OP-419
Mohd Nor, M. A.	OP-169	Omar, M. A.	OP-326
Mohd Nor, M. J.	OP-013	Orak, S.	OP-185
Mohd Razali, N.	OP-236	Oran, B.	OP-274
Mohd Salleh, M. A.	OP-311	Oran, E.	OP-274
Mohd Salleh, N. S.	OP-230	Orhan, E.	OP-065, OP-209, OP-210, PP-056, PP-107
Mohd Salleh, R.	OP-411		
Mohd Yunus, M. F.	OP-157	Orkunoğlu Şahin, I. F.	OP-408
Mohd Yusof, N.	OP-411	Osman, M. H. M.	OP-544
Mohd Zainon, N.	OP-326	Orthman, N. H.	OP-320
Mohd Zainudin, N.	OP-248	Oudira, H.	OP-506
Mokhtar, B.	PP-020	Oudjit, M. N.	OP-242
Mongwai, B. M.	OP-489	Oumeddour, R.	OP-207
Mosleh, A.	OP-249	Oyekanmi, O. O.	OP-273
Moussa, B.	OP-205	Ozdamar, H.	OP-455
Mubin, D. S.	OP-553	Ozgulbas, N.	OP-564
Mugan Ertugral, S.	OP-175	Ozturk, F.	OP-159
Muhammad, J.	OP-503, OP-585		
Muhammad, N. A.	OP-576	<b>Ö</b>	
Mumcu, G.	OP-567	Öger, M.	OP-265
Muneeb Mehta, A.	OP-458	Öksüz, B.	OP-014
Munoz, M.	PP-101	Ölmez, I.	OP-265
Murat, S.	OP-227	Önen, D.	PP-098
Mustafa, M.	OP-018	Öner Gücin, N.	OP-068
Mustafic, A.	OP-218	Örnek, A. Ş.	OP-054, OP-085
Muszali, R.	OP-288	Özbilgin, I. G.	OP-477
Mutlu, A.	OP-348, OP-399	Özcan, K.	OP-202, OP-528
Mutlu, S.	OP-339	Özcüre, G.	OP-142
Muzaffar, H.	OP-587	Özçelik Kayseri, G.	OP-155
Mwansa, L.	OP-271	Özçelik, B.	OP-363, OP-462, OP-560, OP-527
		Özçelik, S.	OP-193
<b>N</b>		Özdemir Aydın, G.	OP-061, OP-062
N( Natesa), M.	OP-552	Özdemir, Y.	OP-337
Naç, E.	OP-173	Özdemir, Y.	OP-601
Naima, B.	OP-205	Özelçi Eceral, T.	OP-051, OP-052
Najihan Yusri, N. A.	OP-351	Özer, M.	OP-406
Naruetharadhol, P.	OP-002, OP-147	Özgül, U.	OP-026
Nasır, S.	OP-121, OP-582	Özkale, O.	OP-367
Nasir, N.	OP-379	Özkan, N. N.	OP-107
Nassima, B.	PP-016	Özkaya, U.	OP-022
Naveed, A.	OP-523	Özkök, Y.	OP-233, OP-266
Nawaz, A.	OP-553	Özköse, H.	OP-220
Nawaz, S.	OP-583	Özkurt Çokgüngör, H.	OP-194
Nazik, F.	PP-070	Özlem, Ş.	OP-444
Nciri, N.	OP-414	Özmen, A.	OP-251
Nechnech, A.	PP-101	Özmutaf, N. M.	OP-087
Nezirli, T.	OP-361, OP-454, PP-052	Özsoy Güneş, Z.	OP-341, OP-342, PP-006
Nezirli, Z.	OP-361, PP-052	Özsoy, Y.	PP-081
Ng, A. W.	OP-086	Öztayşi, B.	OP-424

## INDEX

Öztürk, İ.	OP-158	Sadeqi, R.	OP-249
Öztürk, Ş.	OP-386	Sagor, R. H.	OP-021, OP-314, OP-317
<b>P</b>		Saha, S.	OP-095, OP-421
Paksoy, M.	OP-451	Šahic, E.	OP-484
Park, H.	PP-011	Sahid, I.	OP-198
Pearson, A. R.	OP-201	Sahli, I.	OP-197, OP-203
Pech, R.	OP-559	Saifi, A.	OP-506
Pehlivanoglu, F.	OP-595	Salam, S.	OP-311
Pekovic, S.	OP-450	Salam, Z.	OP-532
Pınar, R. İ.	OP-440	Salimin, N.	OP-119, OP-288
Piškinsüt Şengüler, E.	OP-100	Salimin, N. N.	OP-143
Plata Cepeda, R.	OP-521	Salleh, B. S.	OP-383
Pluempitiwiriyawej, C.	PP-079	Sandhya, G. D.	OP-552
Podushkina, A.	OP-526	Sani, F.	OP-358, OP-538
Polat, N.	OP-130, OP-455	Santamaria, A.	PP-101
Pomiklová, M.	OP-128	Saquib, S. M. T.	OP-382
Puteh, R.	OP-304, PP-100	Sar, T.	OP-524
Pürçüklü, A.	OP-514	Sarange, S. M.	OP-152
<b>R</b>		Sarcan, F.	OP-339
R., N. H.	OP-410	Sarıkaya, M.	OP-027
Rabia, S.	PP-057	Sariyer, D.	OP-212
Rabiah Ahmad, R.	OP-231	Sarnou, H.	OP-146, OP-289
Rahayu, N. S.	OP-172	Sarowar, G.	OP-023, OP-024
Rahayu, R.	OP-035	Saru, M.	OP-423
Rahim, S. A.	OP-198	Sasi, G. A.	OP-579
Rahimov, F.	OP-548	Sati, Y. D. D. Z. E.	OP-280
Rahmat, N.	OP-598	Savaşlıoğlu, M.	PP-044
Rahmouni, Z. E. A.	PP-057	Sayuti, R.	OP-326
Rahou, M.	PP-043	Schaeffer, J.	OP-053
Raja Ikram, R. R.	OP-471	Sebaa, F.	PP-043
Ramily, Z. H.	OP-452	Sebaa, M.	OP-308, PP-097
Ramirez Rios, D. G.	OP-521	Sebaa, M. M.	OP-309, PP-099
Ramlee, N. A.	PP-060	Seckin Halac, D.	OP-224
Ramli, M. Z.	OP-532	Seçgin, A.	OP-462
Ramli, N. S.	OP-103	Sedef, H.	OP-380
Rana, A.	OP-300	Seker, S. E.	OP-238
Rashid, M. A.	OP-504	Selaimia, R.	OP-207
Rashid, N. I.	OP-260, OP-441	Selçuk, A.	OP-477
Rashid, T. O.	OP-360	Selçuk, A. B.	OP-210
Rasmani, K. A.	OP-230	Sengel, T.	OP-175
Raufi, B.	OP-237, OP-346, OP-349, OP-350, OP-476	Seo, J.	PP-011
Razak(ph.d), K. A.	OP-570	Serie, E. A.	OP-503
Razali, S. N.	OP-312	Sern, L. C.	OP-163
Rebiha, D.	OP-396	Sertel Berk, H. Ö.	OP-068
Rejeb, H.	OP-203	Seyfi, L.	OP-022
Ridzuan, M. B.	OP-182, OP-379	Sha`ari, S.	OP-532
Risfandy, T.	OP-254	Shaaban, A.	OP-129
Roisnel, T.	OP-208	Shaaib, A. R.	OP-472
Rokbi, M.	PP-057	Shaburova, L.	OP-526
Roncalés Rabinal, P.	PP-083	Shahbodin, F.	OP-145, OP-312
Rosli, N. T.	OP-140	Shahnaz, L.	PP-050, PP-051
Rosli, Y.	OP-362	Shahriar, K. A.	OP-317
Rouidi, S.	PP-062	Shahril, M. I.	OP-119, OP-288
Rusli, M. R.	OP-343	Shahril, M. I. I.	OP-143
<b>S</b>		Shahrudin, M. Z.	OP-320
Sa Don, N. F.	OP-419	Shamsudin, S.	OP-533
Saadaoui, S.	PP-005	Shaneb, O. A.	OP-493, OP-512, OP-520
Saadon, S.	OP-374	Shareef, K. M.	OP-452
Sabali, M. A.	OP-598	Sharma, A.	PP-068
Saber, M. G.	OP-021, OP-317	Shatri, V. B.	PP-009
Sabirin, M. R.	OP-544	Shipra, A.	OP-522
		Shualdi, W.	OP-576
		Shulyakova, O.	OP-392
		Sib, J. D.	PP-093, PP-094, PP-095
		Sidek, O.	OP-374

## INDEX

- |                             |                        |                        |  |
|-----------------------------|------------------------|------------------------|--|
| Sidek, S.                   | OP-013                 | Taştan Miman, B.       | OP-293, OP-367, OP-519                 |
| Silajdzic, S.               | OP-139                 | Tatar, Y.              | OP-324                                 |
| Simsek, O. F.               | OP-167                 | Tatlı, H.              | OP-222                                 |
| Singh, G.                   | OP-095, OP-421         | Tauer, K.              | PP-021                                 |
| Singh, H.                   | OP-069                 | Tayser Sumer, G.       | OP-150                                 |
| Slimani, S.                 | PP-062                 | Teankrajang, V.        | OP-511                                 |
| Smail, H. A.                | OP-452                 | Teber, S.              | OP-050                                 |
| Smirnova, Y. V.             | OP-400                 | Tekarslan, Ş. H.       | PP-069, PP-085                         |
| Sofuoğlu, M. A.             | OP-019, OP-064, OP-185 | Tekdoğan, O. F.        | OP-259                                 |
| Šollová, K.                 | OP-128                 | Tekin, H.              | OP-259                                 |
| Son Turan, S.               | OP-354, OP-444         | Tektas, A.             | OP-557                                 |
| Soner, O.                   | OP-420                 | Tepe Küçüköğlu, M.     | OP-440                                 |
| Song, S.                    | OP-414                 | Teramoto, S.           | OP-601                                 |
| Songjaroen, T.              | PP-078                 | Terzioğlu, F.          | OP-566                                 |
| Soudani, K.                 | OP-153                 | Terziolu, F.           | PP-067                                 |
| Sönmez, M.                  | PP-070                 | Tezgel, O.             | VP- 010                                |
| Söylemez, A.                | OP-363, OP-462, OP-560 | Thipsingh, S.          | OP-133                                 |
| Söylemez, M.                | OP-483                 | Tiar, C.               | PP-019                                 |
| Stafai, F.                  | OP-479                 | Tiken, M.              | PP-056                                 |
| Staub, S.                   | OP-050, OP-118, OP-316 | Timur, M. C.           | OP-369                                 |
| Stefan, Z.                  | PP-014                 | Ting, I. W. K.         | OP-073                                 |
| Stupar, S.                  | OP-484                 | Topak, M. S.           | OP-556                                 |
| Subari, F.                  | OP-389                 | Topkaya, Ö.            | OP-075                                 |
| Subburathinaraj, H.         | OP-279                 | Toprak, C.             | OP-564                                 |
| Subramaniam, G.             | OP-119                 | Torane, M.             | OP-058                                 |
| Suerdem, A.                 | OP-092                 | Touahmia, M. B.        | OP-417                                 |
| Sulaiman, K.                | OP-318                 | Trianna, N. R.         | OP-544                                 |
| Sulaiman, M. A.             | OP-577                 | Trisakti, B.           | OP-170                                 |
| Sulaiman, S.                | OP-351                 | Trojková, J.           | OP-128                                 |
| Sumer, F.                   | PP-087                 | Tsameti, A.            | OP-445                                 |
| Sung, T.                    | PP-011                 | Tuan Mohd Yasin, S. N. | OP-157                                 |
| Suvorov, O.                 | OP-526                 | Tugral, H.             | OP-536                                 |
| Süerdem, A. K.              | OP-424, OP-481, OP-561 | Tuna, K.               | OP-072, OP-136, OP-599                 |
| Svoboda, L.                 | OP-128                 | Tunaboylu, S.          | OP-274                                 |
| Syed Abdul Rahman, S. N. F. | OP-394                 | Tunay, K. B.           | OP-355, OP-356, OP-020                 |
|                             |                        | Tunay, N.              | OP-355, OP-356                         |
|                             |                        | Tunç, G.               | OP-530                                 |
|                             |                        | Tural, B.              | PP-022, PP-025, PP-031, PP-032, PP-033 |
|                             |                        |                        | PP-033                                 |
|                             |                        | Tural, S.              | PP-022, PP-025, PP-031, PP-032, PP-033 |
|                             |                        |                        | OP-561                                 |
|                             |                        | Turan, I.              | OP-060, OP-061, OP-062                 |
|                             |                        | Turan, N.              | OP-352                                 |
|                             |                        | Turhan, Ç.             | OP-094                                 |
|                             |                        | Turymbetov, T.         | OP-094                                 |
|                             |                        | Türkmen, N. C.         | OP-357                                 |
|                             |                        | Tüzünkan, D.           | OP-176                                 |
|                             |                        | Tzelepis, D.           | OP-543                                 |
|                             |                        |                        |  |
|                             |                        | <b>U</b>               |  |
|                             |                        | Uca, N.                | OP-535                                 |
|                             |                        | Ucak, A.               | OP-431                                 |
|                             |                        | Ucler, C.              | OP-048                                 |
|                             |                        | Uğur, N. G.            | OP-217                                 |
|                             |                        | Ulaş, B.               | PP-070                                 |
|                             |                        | Ulubeyli, G. Ç.        | OP-124, OP-127                         |
|                             |                        | Ulubeyli, S.           | OP-098                                 |
|                             |                        | Uludağ, E.             | OP-459                                 |
|                             |                        | Uncu, F.               | PP-070                                 |
|                             |                        | Usapein, P.            | OP-496                                 |
|                             |                        | Uslu, D.               | OP-574                                 |
|                             |                        | Uslu, T.               | OP-056, OP-080, OP-457, PP-002         |
|                             |                        | Ustabaş, S.            | OP-575, PP-030                         |
|                             |                        | Ustek, D.              | PP-071                                 |
|                             |                        | Utlü, Z.               | OP-040                                 |
|                             |                        |                        |  |
| <b>Ş</b>                    |                        |                        |  |
| Şahin, S.                   | OP-098                 |                        |  |
| Şahin, V.                   | OP-515, OP-516         |                        |  |
| Şanlı Gülbahar, B.          | OP-055, OP-216, OP-353 |                        |  |
| Şarkaya İçelloğlu, C.       | OP-191, OP-256         |                        |  |
| Şataf, C.                   | OP-074                 |                        |  |
| Şekkeli, M.                 | OP-114, OP-375         |                        |  |
| Şen, H.                     | PP-045                 |                        |  |
| Şener, S.                   | OP-406, OP-429         |                        |  |
| Şentürk Akfırat, F.         | OP-200                 |                        |  |
| Şentürk, C.                 | OP-074                 |                        |  |
| Şerbetçi, Z.                | PP-029                 |                        |  |
| Şimşek, İ.                  | PP-007                 |                        |  |
| Şişman Kitapçı, N.          | OP-567                 |                        |  |
| Şişmanoğlu, E.              | OP-045, OP-596         |                        |  |
|                             |                        |                        |  |
| <b>T</b>                    |                        |                        |  |
| Tacgın, E.                  | OP-277                 |                        |  |
| Tahar, A.                   | PP-036, PP-090         |                        |  |
| Tahar, W.                   | PP-091                 |                        |  |
| Tamer, A.                   | PP-080                 |                        |  |
| Tanaka, T.                  | OP-174                 |                        |  |
| Tanrıver, N.                | OP-305, OP-306         |                        |  |
| Tanrıverdi, H.              | OP-298, OP-558         |                        |  |
| Tapramaz, R.                | OP-214, OP-215         |                        |  |
| Tarhan, T.                  | PP-022, PP-025         |                        |  |
| Tarimsal Gülmen, S. S.      | OP-206                 |                        |  |
| Taskin, H.                  | OP-529                 |                        |  |
| Taslim, T.                  | OP-172                 |                        |  |

## INDEX

Uygun, Z.	OP-464	Yıldırım, F.	OP-131
Uysal, A.	OP-149	Yıldırım, P.	OP-365
Uysal, G.	PP-007	Yıldırım, S.	OP-339, OP-542
Uysal, R.	OP-562	Yıldız Tepret, N.	OP-072
Uzel, A.	OP-202, OP-528	Yıldız, B.	OP-111
Uzer, D.	OP-066	Yıldız, C.	OP-114
Uzun, F.	OP-329, OP-507	Yıldız, H.	OP-111
Uzunkaya, C.	OP-264	Yıldız, T.	OP-438
<b>Ü</b>		Yılmaz, A.	OP-371
Ülkü, G.	OP-126, OP-325	Yılmaz, B. T.	OP-253
Ünal, S.	OP-280	Yılmaz, G.	OP-101
Ünalan, M.	OP-031	Yılmaz, M.	OP-093
Ünker, F.	OP-239, OP-240, OP-244, OP-377	Yılmaz, N. F.	OP-451, OP-514
Ünsal, H. T.	OP-302	Yılmaz, S.	OP-012
Üreten, K.	OP-569	Yi, B.	OP-559
<b>V</b>		Yiğit Şakar, A.	OP-192
Van Holm, E. J.	OP-009	Yildirim, I.	OP-437
Vardar, N.	OP-515, OP-516, OP-518	Yildirimci, E.	OP-138
Vatan, M. B.	PP-065, PP-066	Yildiz, U. C.	OP-319
Vayanaperumal, R.	OP-279	Yilmaz, M.	OP-522
Velusamy, P.	OP-279	Yoğurtçu, K.	OP-290
Veral, E. A.	OP-597	Yolaç, S.	OP-004, OP-032
Vercuni, A.	OP-287	Yolcu, E.	OP-341, OP-342
Vetsikas, A.	OP-044	Yolcu, Ö.	OP-341, OP-342
Virutamasen, P.	OP-015, OP-162, OP-177, OP-461	Yoon, J.	OP-539
<b>W</b>		Yousefzadehfard, P.	OP-226
Wahid, R.	OP-394	Yousif, Z. S.	OP-495, OP-501
Wahil, Z.	OP-415	Yu, S.	OP-281
Wahyuni, S.	OP-366	Yuan, H. B.	OP-568
Wan Ibrahim, M. H.	OP-096	Yurder, Y.	OP-121, OP-582
Wan Ismail, W. Z.	OP-456	Yurniwati, Y.	OP-373
Wan Shahrudin, I.	PP-039	Yurtseven, A.	OP-515, OP-516, OP-518
Warkhedkar, R. M.	OP-152	Yusof, F.	OP-129
Wiharto, B.	OP-366	Yusof, R.	OP-232
Winbo, K.	OP-053	Yusoff, N. H.	OP-576
Wongpreedee, K.	OP-015, OP-162, OP-461	Yuzugullu, Y.	OP-201
Wut, T. M.	OP-086	Yüksel, A. H.	OP-110
<b>Y</b>		Yülek, M.	OP-469
Yaacob, N. B.	OP-276	<b>Z</b>	
Yaakub, A.	OP-415	Zadahmad, M.	OP-226
Yahya, M. Z. A.	OP-577	Zafar, A.	OP-300
Yahya, R.	OP-304, PP-100	Zaghinin, M. S.	OP-520
Yahya, S.	OP-441	Zaghwane, H. B.	PP-054
Yalçın İncik, E.	OP-402	Zaimovic, A.	OP-285, OP-218
Yalçın, L.	OP-047	Zaimovic, T.	OP-218
Yalçıntaş, M.	OP-006	Zakaria, N. A.	OP-232
Yaman, Y.	OP-341, OP-342	Zawawi, A.	OP-389
Yamin, B. M.	VP- 005	Zengin, M.	OP-201
Yang, C. H.	OP-405	Zenuni, X.	OP-346, OP-349, OP-350, OP-476
Yapar, M.	OP-196, OP-432	Zeudmi Sahraoui, F.	PP-095
Yapıcı, M.	OP-422	Zhunisso, N.	OP-094
Yaşar Akçalı, B.	OP-045, OP-596	Ziani, M.	OP-463
Yatim, N. M.	OP-129	Zine El Abidine, R.	PP-041
Yavuz, I.	OP-252		
Yazar, H.	PP-080		
Yazar, M.	PP-053		
Yeğen, G.	PP-081		
Yel, H.	OP-321		
Yenicioglu, B.	OP-092		
Yeşilçimen Akbaş, M.	OP-525, OP-527, PP-087		
Yeşiltepe, M.	OP-263		

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---

---

**FULL PAPER INDEX**

---

---

## INDEX

Abdennour, C.	PFP-007	Muhamed, N.	PFP-006
Abdullah, N.	OFP-027	Nazif, N. K. A.	OFP-006
Ahadina, F.	OFP-011	Nurhaizan, M. Z.	OFP-006
Ahmad, A.	OFP-025	Omar, M. A.	OFP-027
Ahmad, F. S.	OFP-002	Özdemir, A.	OFP-024
Aimouch, D. E.	OFP-028	Özdemir, Y.	OFP-029
Akhtar, M. N.	PFP-006	Özmen, A.	OFP-009
Amrouche, T.	PFP-008	Rabinal, P. R.	PFP-008
Arayesh, M. B.	OFP-008, OFP-010	Radzi, M. K. F.	PFP-006
Baharuddin, M. Y.	OFP-027	Rahman, N. A.	OFP-026
Baitiche, M.	OFP-017, PFP-004, PFP-005	Rejeb, H.	OFP-020
Bajwa, S. U.	OFP-004	Rosli, N. T.	OFP-002
Bali, A.	OFP-021	Rouidi, S.	PFP-007
Beddar, M.	OFP-021, OFP-023	Sadeghi, R.	OFP-007
Bencaci, H.	OFP-021	Sahli, I.	OFP-020
Benferrah, N.	PFP-003	Salim, N. A. M. A.	OFP-013
Bilge, A. N.	OFP-022	Sania, F.	OFP-011
Bouglouf, M.	PFP-009	Sauti, R.	OFP-027
Boukourt, A.	OFP-028	Sawsena, B.	PFP-001
Büyükyıldız, M.	OFP-029	Skander, S.	PFP-001
Chetty, A.	OFP-005	Sliman, S.	PFP-007
Çelik, F.	OFP-009	Sulong, A. B.	PFP-006
Daamiche, R.	OFP-017	Suziyana, M. D.	OFP-006
Danoun, K.	PFP-008	Syuhada, H. R.	OFP-006
Demirtaş, İ.	OFP-018	Tatli, H.	OFP-003
Djebar, A. B.	PFP-009	Teramoto, S.	OFP-001
Djenane, D.	PFP-008	Tharazi, I.	PFP-006
Djerbal, M.	PFP-008	Tholibon, D.	PFP-006
Dokari, H.	PFP-003	Tuah, N.	OFP-019
Dziri, F.	PFP-008	Tuna, K.	OFP-016
Eryiğit, N.	OFP-014	Uslu, T.	OFP-014, PFP002
Fadzida, I.	OFP-006	Uzun, F.	OFP-022
Farhat, B. H.	OFP-020	Villemin, D.	PFP-003
Fisher, J.	OFP-012	Zaoui, A.	OFP-028
Gacem, M. E. H.	OFP-023		
Gecibesler, İ. H.	OFP-018		
Ghemit, R.	PFP-004, PFP-005		
Gökçe, K. D.	OFP-016		
Gueddah, D.	PFP-007, PFP-009		
Gül, M.	OFP-029		
Halim, M. S. B. A.	OFP-013		
Hamdane, A.	OFP-023		
Hammadi, M.	PFP-003		
Hasan, M.	OFP-019		
Hashmi, I.	OFP-015		
Idris, S. S.	OFP-026		
Irshad, A.	OFP-015		
Ismail, K.	OFP-026		
Ismail, N. F.	PFP-006		
Ismail, W. Z. W.	OFP-013		
Jamaluddin, M. A.	OFP-026		
Johari, N.	OFP-027		
Kalimasyada, D.	OFP-011		
Khoja, M.	OFP-012		
Lemon, M.	OFP-012		
Levet, A.	OFP-029		
Makhloufi, A.	PFP-004, PFP-005		
Maktabi, H.	OFP-007		
Maseleno, A.	OFP-019		
Meddah, A.	OFP-021, OFP-023		
Mehta, A. M.	OFP-015		
Merbah, M.	PFP-004		
Meskine, S.	OFP-028		
Mohamad, M.	OFP-013		
Mosleh, M.	OFP-007		







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