Impact of knowledge management on sustainable development in the innovative economy

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ABSTRACT

The purpose of this paper is to study the importance of sustainable development in the innovative economy. Knowledge-based processes in the innovative economy seem to open up several new avenues to be explored in the direction of sustainability. The theory of the innovative economy, in contrast to the neoclassical theory, is not based on the accumulation of financial capital as the main driver of economic growth in the knowledge-based economy but in greater extend on intellectual capital. This new business logic assumes that the rate of economic growth in the innovation economy depends on the products and/or services that are incurred predominantly as a result of knowledge integration. The emergence of the internet in the early 90s affected the growth of dot.com online businesses and the emergence of the third wave of capitalism. In the current economic crisis and recession, the consequences of low economic growth will further affect the changes in the global markets. This is reflected in different behaviour of consumers and resulting in the development of new business models, which include the concepts of sustainability. The paper examines critical factors that influence the role of innovative technologies in organizational change to ensure sustainability. Focus on sustainability directs corporate behaviour towards the environmental protection, which presumes the fulfilment of
organizational and human needs. Therefore, current demands can be satisfied in the present, but the resources for their fulfilment will be preserved for future generations. In order to realise this goal, companies must invest in assets that provide sustainable development. Companies that comply with the sustainability concept are expected to create greater value. This conceptual paper contributes to ongoing discussion about increasingly important role of sustainable development as a major concern for the European Union, companies and NGO’s that have to develop new policies in order to foster sustainable growth of the society.

Keywords: Knowledge management, Innovative economy, Sustainable development, Organizational changes, Value added.

1. INTRODUCTION

For the last decade our society is on an unsustainable course. The world is facing numerous long-term challenges including climate changes, population ageing, desertification, water scarcity, pollution and critical raw material scarcities (Montalto et al., 2007; Elliott, 2006). The financial crisis that started in the 2008 is an indicator how short-term profitability mindsets and related strategies, policies and actions of individuals and individual organizations can cause global economic, ecological and ethical crises. These events have contributed to the judgement that most organizations operate on business models that are not sustainable (Boons et al., 2013). Two major economic players, the U.S. and the EU, have begun to lose their advantage in the field of innovation in traditional as well as in selected high-tech sectors. Brazil, Russia, India, China, South Korea, Turkey, Indonesia, etc., are the newcomers into global markets (Montobbio et al., 2013). In the last few years, disposable income growth of China and India is soaring at 8% a year as opposed to mere 2% in the U.S. and 1% in Japan. According to high economic growth and digital adoption in the emerging markets is rising up their middle class with higher income. In today’s knowledge society, it is urgent to find out the solutions for structural reforms. Greater adoption of sustainability challenge by businesses would significantly advance the holistic approach with connected knowledge activities (Mulej & Potocan, 2007; Ny, Hallstedt & Ericson, 2013). Such holistic models include the promotion of sustainable development and are applying the term sustainable beyond the environmental dimensions. The structural reforms include promotions of the long-term planning to ensure continuity in policy through political changes. Local and state authorities together with the communities have ensured the creation of green jobs (energy and climate changes). Creation of new jobs in clean and innovative technologies will affect both the sustainability (improving the quality of human life) and the reduction of unemployment.

The goal of this paper is to achieve a better understanding of the impact of knowledge management on sustainable development in the innovative economy. The paper is structured as follows. After the introductory section, the second section explores the theoretical frameworks of knowledge management and new economic theories. The third section of the paper discusses the challenges of the knowledge management in the era of sustainable development of social and business environment. The fourth section of the paper includes creation of sustainable value added model in the innovative economy.
2. SIGNIFICANCE OF KNOWLEDGE MANAGEMENT IN THE 21ST CENTURY

McElroy (2003) divided the development of knowledge management into many phases. Both, the first and second phase of knowledge management appeared in the mid-1990s. During the first phase, called first-generation knowledge management, organizations assumed that the valuable knowledge is out there, and all that it is required of them is to capture, decode and share it. In accordance with this view of the knowledge management, the procedures of knowledge management begin after the production of knowledge. The purpose of knowledge management is to ensure the production of knowledge, but it is based on the development of knowledge and its transformation in the practice. The main characteristic of this first phase is that organizations do not need to highlight the production of knowledge but only its integration.

The second-generation of knowledge management is based on the assumption that knowledge has to be produced in a social environment. Knowledge is created through the processes of individuals and knowledge sharing for its accuracy. This process at the organizational level is defined as knowledge life cycle. A fundamental feature of the second generation of knowledge management is that it includes the creation of the knowledge and its integration.

The third phase of knowledge management started around 2003. It was based on the awareness of the importance of content, the importance of the retrievable, importance of the arrangement, description and structure of that content (McInerney & Koenig, 2011).

The current phase of knowledge management is characterized by the awareness of the importance of external information and knowledge to the organization. Providing access to external information and knowledge, including their involvement in the value chain creation is of utmost importance.

Important characteristics of knowledge organizations are in their advantageous utilization of superior information technology and highly skilled employees (knowledge workers) that is able to implement its innovative activities into realization (Li & Xu, 2011).

From financial-accounting point of view, knowledge organizations typically include in their balances more intangible assets. Intangible assets have a greater advantage over tangible assets in knowledge organizations, as demonstrated already by Drucker (1999) who defined knowledge workers in some cases even as a main tool in the organization of knowledge and in some cases even as a main tool in the knowledge organization.

Sveiby and Lloyd (2009) conclude that the main features of the organization that enters the phase of knowledge organization are: intangible assets and exploiting the limited resources of the knowledge era. Grover and Davenport (2001) argue that the processes of knowledge management are located between information and the sources of income in the organization (e.g. services rendered or sold products), aiming towards the acquisition of knowledge, the definition of knowledge and the knowledge transfer.

3. CONCEPTUAL FRAMEWORKS

3.1. The theory of the new economy

The new economy, which is often called the knowledge economy and economics of networks, is a synonym for the transition from "traditional heavy industry" into the technological development-oriented economy (Alexander, 1983). The new economy has brought organizational changes in strategies, structures and management styles. As for managers, they are expected to dominate the release, management and use of resources, as opposed to the
strategies of the old economy, which emphasizes the need for formal links and ownership of own resources.

The new economy has influenced the emergence of global competition and the first global crisis was caused by the collapse of dot-com companies. Changes in macro trends are affecting the uncertainty in the business environment. Organizations are being forced to adopt a comprehensive infrastructure that is based on a more flexible organizational structure for implementing on-demand marketing and technological innovation (Autry, Goldsby & Bell, 2013). At the same time, it is necessary to realize that the ability to develop or gain the basics of modern information and communication technologies plays an important role in the economic and social development (Bertot, Jaeger & Hansen, 2012).

Conservative organizations are faced with demands for policy change management and organizational structures which are based on the Taylor paradigm hierarchy. At the same time, it is necessary to realize that the ability to develop knowledge and conquest of high-tech information and communication technologies play an important role in the economic and social development. By achieving the strategic goals of the organization, this has an impact on increased productivity and efficiency, added value and consequently the development of economy and society (Bisson, Stephenson & Vigurie, 2010; Kaplan & Mikes, 2012).

The emergence of the Internet in the new economy in the early nineties of the twentieth century (named in this period as the internet or digital economy) has influenced the rise of the third wave of capitalism. During the current economic crisis and recession, the consequences of which are seen in the form of low economic growth, the emergence of internet technologies joined with digital technology, which further affects the changes in global markets, which in turn are reflected in different ways in consumer behavior and consequently in the development of new business models (Roblek et al., 2013).

The stock market crisis caused by the overestimated value of shares of emerging technology organizations in the early 21st century ended the period of the new economy.

Large investments in information technology (IT) within the nineties of the twentieth century last century in the U.S. have not led to the expected effects and the position of Alan Greenspan that the U.S. has a high economic growth, low unemployment and low inflation as a result of the development of IT has proven to be incorrect. The studies suggest that almost half of all projects initiated in the field of IT actually failed (Gualerzi & Nell, 2010).

The knowledge economy can also have a negative effect on the economy. Von Osten (2004) highlights the controlled access to knowledge and information as assets is actually leading to new global power differences.

Pagano and Rossi (2009) argue that the cause for the last economic crisis was the knowledge economy. The authors claim that the cause of the crisis lies at the monopoly of developed countries over intellectual rights. International agreements on trade-related aspects of intellectual property have caused a rise in the cost of investments in countries that had neither abundant inexpensive labor nor high amounts of intellectual property. The authors believe the solution to the crisis, besides changes in monetary policy, financial regulation and standards of Keynesian economic policy, also needs a measure that will reduce the intellectual monopolization of the economy.

The new economy has been succeeded by the innovative economy (summary innovative economy), which introduces new approaches for the development of business models in the process of organizational evolution (see Table 1).
In the eighties of the twentieth century, in the so-called new economy, the knowledge and flexibility of organizational structures had a significant impact on the performance of organizations. In today’s innovation economy innovation and intuition are the critical success factors (Kuula, Putkiranta & Toivanen, 2012; Bertoncelj, Kovač & Bertoncel, 2009).

Table 1. The period of transformation from the old to the new and the innovative economy

<table>
<thead>
<tr>
<th>Old economy</th>
<th>New economy</th>
<th>Innovative economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>2006</td>
<td>2003</td>
</tr>
<tr>
<td>Taylor hierarchical system</td>
<td>Flat organization</td>
<td>Lean and virtual organization, networking</td>
</tr>
<tr>
<td>financial capital, production facilities, material goods</td>
<td>financial and social capital in the form of talented people who do create jobs, and there are extendible to greater independence from the culture of the older generations</td>
<td>social capital, with an emphasis on sustainable development of natural resources, aspirations for social justice and less stressful working environment</td>
</tr>
<tr>
<td>industrial sector</td>
<td>sectoral dispersion, clusters of interrelated activities</td>
<td>social networks, clustering of different activities with each other in order to find new solutions, outside of the framework of each science</td>
</tr>
<tr>
<td>productivity</td>
<td>profitability</td>
<td>innovativeness</td>
</tr>
<tr>
<td>quantity</td>
<td>quality</td>
<td>creativity</td>
</tr>
<tr>
<td>production dependent on fossil fuels</td>
<td>communication dependencies</td>
<td>communication dependence, sustainable resource development</td>
</tr>
<tr>
<td>long-term business planning, little change and this only at the operational level as well as the layout of production in one place</td>
<td>short-term business planning, more rapid changes, both at operational and strategic levels of operations</td>
<td>planning operations due to constant changes, which require a permanent change at all levels of business, is not possible</td>
</tr>
<tr>
<td>the success achieved on the basis of related competitive advantages set of resources and skills. The workforce has been trained for each function in the production process</td>
<td>success depends on the ability to learn and adapt organizations and personnel to market conditions</td>
<td>success depends on the ability to develop and use intuition</td>
</tr>
<tr>
<td>competitiveness is achieved at the expense of lowering operating costs, lower taxes and lower labour costs</td>
<td>competitiveness is achieved by moving companies in places where talented personnel, adequate business environment, which allows developed business and social infrastructure, which facilitates the development of business partnerships and providing trained personnel with ideas</td>
<td>developed infrastructure environment with well-developed public transport, fast and affordable web links and cultural environment that allows personality development</td>
</tr>
<tr>
<td>knowledge concentrated in management</td>
<td>knowledge is concentrated in the organization's employees</td>
<td>knowledge stored outside organizations free access</td>
</tr>
<tr>
<td>the labour market has been largely regional</td>
<td>the labour market has become global, present many physical relocation of staff worldwide</td>
<td>global labour market, virtualization business to learn and work from home</td>
</tr>
<tr>
<td>economic development led government. Large state apparatus meant good public service.</td>
<td>partner links were established between business, state and non-profit sectors</td>
<td>reduction of the state apparatus to a minimum, taking over the functions of government by the non-profit sector with the support of businesses and the transition to e-law, e-education, etc.</td>
</tr>
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3.2 The emergence of the innovative economy

Innovative economics theory, contrary to neoclassical one, is arising from the thesis that capital accumulation is the main vehicle for economic growth in knowledge-based economy of the 21st century. This new business logic assumes that the rate of economic growth in the innovative economy depends on the products or services, as a result of knowledge (Antonelli, 2003). Thus the emergence of innovative entrepreneurship has evolved based on the R&D, deregulation of certain activities, venture capital, enhancement of intellectual property rights (patents and licenses) and facilitation of the networking organization that facilitates cooperation among businesses (e.g. clustering).

Network economics considers the integration as a strategic instrument that affects the production of knowledge and increasingly important role of information and people with knowledge for the modern knowledge society. Network management provides an upgrade or appropriate synergy between the co-management of information, knowledge and human resources. Knowledge and information have become a key factor for success in the new economy as an innovative economy (Atkinson & Ezell, 2012).

4. IMPACT OF KNOWLEDGE MANAGEMENT ON SUSTAINABLE BUSINESS DEVELOPMENT

4.1 Organizational knowledge as economic resource

The microeconomic theory of allocation of public goods is based on taximetrics resources (technical) knowledge defined as a "quasi" public good (Brinkley, 2006; Davis et al., 2005).

The theory of public finance knowledge ranks among meritorious good and goods of special public interest. Knowledge is a good of which the supply is in the public interest despite the fact that it is actually a private property. Organizations cannot prevent the leakage of knowledge (Brinkley, 2006). The public interest is manifested through public funding of the various forms of knowledge.

Attention is given to the situation on the market where the demand curve of the knowledge is often too much on the left, which means that at a given price, there would be substantial demand for the quantity of knowledge, which is at the lower availability than the socially desirable quantity.

In such case, governments interfere with actions of financing the various forms of knowledge. They try to optimize the allocation of scarce resources such as defined information and knowledge as a unique feature, by that changing the actual meaning of the lack of knowledge as a commodity. The reason for this is the lack of expansion of knowledge, because the knowledge is openly published and is accessible to all and the marginal costs are equal to zero (Houghton & Sheehan, 2000). The main characteristic of knowledge is that represents a renewable resource (Brinkley, 2006).

The value of knowledge is established by the extent of knowledge sharing within the organization and with suppliers and customers (knowledge sharing outside the organization). When knowledge sharing occurs with external partners it is subject to certain transfer restrictions due to the risk of industrial espionage (Brinkley, 2006).
4.2 Socio-economic aspects of sustainable development

Sustainable development is one of the key factors for success of modern organizations due to the fact that they should operate on long-term basis, systematically and strategic (Jenko, 2008). Sustainable development enhances the reputation of organizations and consumers are more willing to pay an appropriate price for their products and services. Consumers largely support organizations that built their business model on sustainability (Pirsch, Gupa & Grau, 2007). Positive image of organizations provides a greater ability to attract capital, business partners and customers. Sustainability may be an important factor in obtaining, retaining and motivating employees and the management of human capital. Retaining of in-house talents reduces the cost of hiring new ones and training them. Each organization can identify the best solutions to problems in its areas of work, from which they can gain competitive advantage over others (Porter & Kramer, 2006).

The consequences of financial crises together with climate changes demand solutions available within the concept of sustainable development. That will affect all cultural levels of contemporary organizations which are challenged by global changes. Organizations have to reconsider their environmental responsibility and check whether it fits into their basic concept of development and by this they affect their organizational culture (Schein, 2010). Eco-friendly countries are increasingly putting more value on social indicators which measure social responsibility. They measure the level of readiness the corporations take to carry out their environmentally-protective activities. Based on past investments in eco-projects, the agencies than calculate social indicators and make their assessment on the basis of business plans, future investments in environmentally friendly projects. According to such ecological indicators the socially conscious investors get the information which organizations act in a socially responsible manner (Chatterji et al., 2009).

5. THE CASES OF SUSTAINABLE DEVELOPMENT INITIATIVES

5.1 Aluminium Stewardship Initiative

Several business cases that have emerged in the past few years show the importance of NGOs in organizing and managing sustainable and environment-friendly oriented industrial projects. Organizations as Aleris, Amcor Flexibles, AMAG / Constantia Flexibles, Audi, Ball Corporation, BMW Group, Constellium, Hydro, Nespresso, Novelis, Rexam, Rio Tinto Alcan, and Tetra Pak have joined in the 2012 the Aluminium Stewardship Initiative (ASI). Standards applicable to companies are formed under the auspices of UCN’s Global Business and Biodiversity Program. ASI’s objective is to develop the Aluminium Stewardship Initiative Standard that will address environmental, social and governance aspects relevant to the aluminium value chain (see Figure 1) (ASI, 2013).

In many of its applications, aluminium provides environmental benefits. Its light weight means it improves the fuel economy of cars and planes and reduces emissions. And, when that vehicle is finally scrapped, 95% of the aluminium can be recycled. Because aluminium is infinitely recyclable, 75% of all aluminium ever produced is still in use with no loss in quality. Recycling aluminium uses only 5% of the energy, and creates 5% of the greenhouse gas emissions, compared with primary production. Drink cans are among the most recycled aluminium products and can be back on the shelf just six weeks after their first use.
Figure 1. Aluminium value chain


5.2 FPInnovations

Another case comes from the field of forestry and wood-processing industries. FPInnovations is among the world’s largest private, not-for-profit forest research centers. It helps the Canadian forest industry develop innovative solutions based on the unique attributes of Canada’s forest resources, with a focus on sustainable development and taking full advantage of the industry’s substantial scientific, technological and commercial capital (FPInnovations, 2013). FPInnovations has been a catalyst in creating an innovation hub for the forest sector involving the industry, governments, universities, suppliers and the innovation capacity of FPInnovations. The hub brings together stakeholders with diversified backgrounds who share one common bond – to see the industry thrive through the development and deployment of innovation and what that means for a sustainable future.

A place where things come together, the hub enables the convergence of three essential strengths for our sector’s future development and market alignment, namely: industry initiative and capital, innovative R&D and engineering resources, and financial support from government partners.

The industry generates more value from its wood basket based on fiber quality, product flow and supply chain agility, implementing value in concepts at the operational, tactical and strategic levels, and developing decision-support tools driven by market needs.

5.3 Alpine Space Program

The Alpine region of individual countries that are members of the Alpine Space Program, have recognized the importance of innovation economics concepts for social and environmental development and suggested that the new financial perspective (2014-2020) allocates funds to projects that will be targeted on below mentioned priorities (Alpine Space Program, 2013):

- Priority 1 will focus on framework conditions for innovation, improved delivery of services of general interest and governance innovation;
- Priority 2 shall support the establishment of low carbon policy instruments and mobility and transport solutions.
- Priority 3 shall deal with cultural and natural heritage as well as with the protection and connectivity of ecosystems.

The future Alpine Space Program will combine three functions: to trigger and fund actions, to feed debates on long-term Alpine development and to serve as a catalyst for improved (institutional) cooperation in the area.
6. SUSTAINABLE VALUE CREATION MODEL IN THE INNOVATIVE ECONOMY

Construction of the model depends on the content and purpose of using the subjective of the sustainable oriented value added model. Table 2 represents a sustainable oriented value added model in innovative economy.

Knowledge is seen as the key of a sustainable competitive advantage in the new economy. An organization needs to develop an organizational culture to raise the level of awareness of employees to create and share knowledge as the basic concept of business, allowing further growth of the organization. An organizational culture based on sharing knowledge, providing opportunities for developing knowledge management processes, which are closely associated with creating added value, is essential (Roblek et al., 2013).

The innovative economical system involves major critical factors i.e. social capital and innovativeness and reverse innovation opposite the globalisation. Sustainable development and increased uncertainty in the society and business environment are forcing organizations to inflict a constant reconstruction of a comprehensive reconstruction as a strategic goal.

Non-government organizations (NGO) are taking over the functions of government with the support of business and the transition to e-law, e-education, and e-health.

The renewal is based on a more flexible organizational structure including the introduction of sustainable development of human resource management, sustainable development of environmental resources and sustainable development of financial resources.

7. CONCLUSION

The growing interest in corporate social responsibility and an increasing number of organizations which include the principles of sustainable development into their business policy leads to the value added of society as a whole.

The main challenge in an innovative economy towards the transition to greener, cleaner and more equitable economic growth is to address innovation not only from an economic, but also from a social and environmental dimension.

Human society and organizations should be aware that only the investment in new innovative concepts such as “eco-innovation”, “social innovation”, “open innovation”, or institutional, governance and organizational innovation are increasingly regarded the markets and society to move towards societal progress with an equal, low-carbon and knowledge economy.
Table 2. Sustainable value creation model

[Diagram showing the sustainable value creation model with factors such as socio-political system, innovative economic system, and sustainable development.]
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