Abstract

Purpose – The purpose of this paper is to propose a generic model of Integrated Management System of Quality, Environment and Safety (IMS-QES) that can be adapted and progressively to assimilate various Management Systems, of which highlights: ISO 9001 for Quality; ISO 14001 for Environment; OHSAS 18001 for Occupational Health and Safety.

Design/methodology/approach – The model was designed in the real environment of a Portuguese Organization and 160 employees were surveyed. The rate response was equal to 86 percent. The conceived model was implemented in a first phase for the integration of Quality, Environment and Safety Management Systems.

Findings – Among the main findings of the survey the paper highlights: the elimination of conflicts between individual systems with resources optimization; creation of added value to the business by eliminating several types of wastes; the integrated management of sustainability components in a global market; the improvement of partnerships with suppliers of goods and services; reducing the number of internal and external audits.

Originality/value – This case study is one of the first Portuguese empirical researches about IMS-QES and the paper believes that it can be useful in the creation of a Portuguese guideline for integration, namely the Quality Management Systems; Environmental Management Systems and Occupational Health and Safety Management Systems among others.

Keywords Sustainability, Environment, Safety, Continuous improvement, Quality, Integrated Management Systems (IMS), Management System Standards (MSS)

Paper type Research paper

1. Introduction

More than ever, today, is in question the business sustainability of the organizations and the focus should be placed far much more than financial results. These results will not verify if that focus does not prioritize also, the satisfaction, balanced, integrated and growing of the customers and others relevant stakeholders, that are clearly and objectively the employees, for example (Rebelo, 2011). Hence, human resources are the most valuable resource of any company or country, but not always the most valued. Thus, the greatest asset of any organization, any region or any country, are people with their know-how (Santos, 2002).

On other hand, certification of products and processes began during the 1960s in the manufacturing industry, as a tool to control and assure the quality/conformity of products and services provided by suppliers to customers/consumers (Wright, 2000). At first the implementation of a Quality Management System (QMS) was particularly
relevant in high demanding activity sectors, like the automotive and aeronautical industries, but it has rapidly extended to every activity sector, becoming a common requisite of any organization worldwide and a factor of competitiveness and survival. Their aim being a reduction of defective products and lost time, as well as, striving for customer satisfaction and excellence. The second Management System to be implemented and certified was the Environmental Management System (EMS). Thus, due to the increasingly demanding environmental legislation in developed countries, organizations nowadays are required to seriously take into consideration not only environmental aspects associated to the production chain itself, but also to the life cycle of their products. They are forced to implement suitable EMS to reduce wastes and to protect environment. This is a particularly important issue for small and medium-sized organizations (SMEs), which are considered to make up the vast majority of business in Europe (Zorpas, 2010).


Thus, following both the Rio Conference in 1992 and General Agreement on Tariffs and Trade negotiations, international standards have become important for succeeding and for getting access to the markets; at the same time, there has been an increase in the interest of environmental management. Such regulatory and competitive pressures have caused organizations to take into consideration the environmental issues within their own production and market plans. Many organizations have attempted to seek an effective EMS. These have led to implementation and development of the ISO 14001 (ISO, 2004) standard for assessing environmental management processes. Today, all over the world, many organizations are seeking ISO 14001 (ISO, 2004) certification (Turk, 2009). In a sense, the value of the ISO 14001 (ISO, 2004) certificate, as a proof of environmental performance, is a combination of the supplier’s environmental ambitions, the advancement of supply chain practices of the customer and the ambitions of the certification bodies (Nawrocka et al., 2009). On other hand, according to Casadesús et al. (2008), and others authors, the interest shown by organizations and other entities linked by the implementation of EMS, especially the family of ISO 14000 standards and the EMAS regulation in Europe, has grown spectacularly all over the world in recent years, even though, a certain saturation has been detected in some countries. Large organizations are increasingly requiring this management policy from their suppliers, establishing specific requirements and performances that SMEs often find extremely difficult to accomplish. On other hand, there are many organizations which, either because of the demands of the market itself or because of other internal motivations, have implemented different Management Systems alongside their EMS. In fact, although no reliable references on this matter have been found, it is quite plausible to think that the great majority of ISO 14001 (ISO, 2004) – registered organizations are also certified in accordance with the ISO 9001 (ISO, 2008) standard (Karapetrovic and Casadesús, 2009).
In most cases, the sequence of implementation will trail the publication of standards, namely ISO 9001 (ISO, 2008) based QMS would be introduced first, followed by an ISO 14001 (ISO, 2004) – compliant EMS (Karapetrovic and Casadesus, 2009). Thus, quality management philosophy and methods have been imported into ISO 14001 (ISO, 2004) from ISO 9001 (ISO, 2008). As a result, it is not surprising that measurement and evaluation are enshrined as important hallmarks of an effective EMS. Generally speaking, this component of the EMS is considered effective when the contents of review meetings are well communicated, the focus of meetings is on improving the system, findings (i.e. about noncompliance, from various statistical charts, and audit results) are reported honestly, and corrective actions follow (Fryxell and Szeto, 2002).

In some cases, the similarities between QMS and EMS systems can facilitate the integration of the two related Management Systems (Tari and Molina-Azorin, 2010). The people that work in environmental management and at the same time are members of quality teams, assure that quality management goes hand-in-hand with environmental management. The actions that are carried out to achieve quality are, in many situations, the same actions necessary, for example, to achieve effective environmental management. In line with this, ISO 14001 (ISO, 2004) has become compatible with the ISO 9001 (ISO, 2008). Consequently, the integration of environmental issues (including environmental protection and pollution prevention in the management of organizations through the implementation of an EMS) allow acquiring a deep insight of the most important environmental aspects associated with its activity, and identifying the processes that need to be improved through the implementation of effective environmental measures (Fresner and Engelhardt, 2004). Thus, improved environmental management in the industrial sector is required to protect the environment, protect human health and property, and to satisfy environmental requirements associated with international trade (Kwon et al., 2002).

Moreover, creating and maintaining a safe working environment ensures that workers have high health levels, protecting them from accidents, illness or discomfort in the workplace and increases the efficiency of work processes, improves employee perceptions of their working environment and leads to higher recruitment attractiveness (Tsai and Chou, 2009). Such aspects generate obvious benefits for entrepreneurs and employees, increasing an organization’s competitiveness while decreasing social costs. To achieve such a goal, companies are now implementing Occupational Health and Safety Management Systems (OHSMS), creating sustainable competitive advantages. Thus, the implementation and management of all economical, environmental and social aspects within an organization is gradually becoming a crucial requirement for any business and has become a widespread phenomenon around the world (Zeng et al., 2007). As such, it is important to know that to help organizations tackling occupational safety and health challenges continuously and improving control on factors influencing health and safety. Safety Management Systems (SMSs) have recently experienced an increasing diffusion between organizations (Bottani et al., 2009), but the major shortcoming with most of safety culture models is the lack of their integration into general models of organizational culture (Choudhry et al., 2007). Hence, to achieve excellence in prevention, safety must be integrated into all the organization’s decisions and actions, and the prevention must be more organizational and strategic than material, given the important role that the human component plays in the causal chain of workplace accidents (Fernández-Muñiz et al., 2009).
In this context of real and new paradigms of management – the Global Quality Management – it imposes to seek permanent the business excellence. Hence, in a not distant past, some organizations in Portugal and other countries, although in a small percentage, began to integrate their Management Systems, the QMS, the EMS and the OHSMS. For this purpose, it were conceived integrated procedures in order to make the integration of two systems (quality, environment or safety) and whenever possible, the three systems Quality, Environment and Safety (Santos et al., 2011). It reveals the growing interest that has been demonstrated by organizations in the adoption of a normative reference ISO 9001 (ISO, 2008), ISO 14001 (ISO, 2004) and OHSAS 18001 (BSI, BS OHSAS, 2007) among others. On the other hand, the integration of Management Systems, supported by those normative references in a single system, taking into account the correspondence and the level of compatibility between them and potential tangible and intangible gains resulting from this integration will be an added value that organizations do not can bleach (Rebelo, 2011). Moreover, the new ISO 19011:2011 (ISO, 2011) – Guidelines for Auditing Management Systems, has been expanded to reflect current thinking and the complexities of auditing multiple MSS and encourages the organizations to integrate the several (sub) Management Systems and enhances itself that gains. The recent ISO 9004:2011 (ISO, 2009) – Managing for the Sustained Success of an Organization – A Quality Management Approach, is too an excellent auxiliary for the organizations that are quickest and want to be most efficient in the application of the several MSS and consequently to continue to achieve a competitive advantage.

The objective of this work is to contribute to an Integrated Management System of Quality, Environment and Safety (IMS-QES) model in a real work environment and to potentiate for the future a generic model of Integrated Management System (IMS), by including news components and related guiding principles and action of each one, that can progressively to assimilate others MSS, considering the several similarities between the MSS, the needs and expectations of several stakeholders, the specific internal work environment of the organization and the strategy for the future of the business.

2. Materials and method
The work was developed in business environment, in a Portuguese Organization that over the years has been adopting, in whole or in part, gradually and individualized standards or specifications of different Management Systems, relevant to the ISO 9001 (ISO, 2008) (QMS), ISO 17025 (Laboratory Accreditation), ISO 14001 (ISO, 2004) (EMS) and OHSAS 18001 (BSI, BS OHSAS, 2007) among others.

While it is imperative to assess the perception of employees of the organization on the structuring, implementation and evaluation of the integration model and its validation in a real work environment, it was developed an internal research through a questionnaire. The total population was 160 employees which are the organization structure of the different branches and levels. The responses rate was 86 percent. The data collection, analyses and presentation were supported on the guidelines of the Portuguese Standard – NP 4463:2009 – Guidance on statistical techniques.

Were considered four questions: Question 1 – Importance of the 12 factors identified as motivation for the implementation of the IMS-QES; Question 2 – Influence of stakeholders identified nine shares on the performance and evolution of IMS-QES; Question 3 – Main difficulties in the context of the development and implementation model. It were identified seven potential difficulties for which the respondents chosen
the main. Question 4 – Potential benefits with the implementation of IMS-QES. In all, 11 potentials benefits were identified for which the respondent chosen the main.

3. Results and discussion

From the statistical analyses, resulting from the responses of the survey, it is presented a set of conclusions by itself revealing the importance in the present and the future, all the various “motivating factors” that evaluated and alone justify and validate the model of implementation of the IMS-QES in the organization, either in the internal aspects such as: rationalization and optimization of resources, reduction of costs and bureaucracy. And also in the external aspects, such as: increasing competitiveness, to satisfy the growing demands of customers and others stakeholders. It also was identified a number of difficulties, shown in the Figure 1, from that highlight: deficit of human and material resources and resistance to change.

Potential benefits, are shown in the Figure 2 from that highlight: The integrated management of sustainability components in a global market, where quality no longer makes a competitive difference and is now just a starting point for a business; common management policy, objectives, targets and Key Process Indicators (KPIs) related to QES performance; the elimination of conflicts between individual systems; improvement to the organization’s internal and external image and to its credibility in QES areas, specifically in relationships with Clients, official entities and other stakeholders; involvement and consolidation, by all employees, of a continual improvement culture of a global QES scopes; a reduction in the number of internal and/or external audits and audits of suppliers and the consequential amount of time taken and associated costs; the creation of added value for the business through the elimination of waste, especially that of bureaucracy associated with independent Management Systems and their certifications, including the laboratories and Measuring Instruments Directive; improvements to the coordinated and integrated management of risks to the safety of people and property, the environment and the quality of products from “cradle to grave”; greater valuation and motivation of employees as a result of the expansion of their skill base, actions and responsibilities,

**Figure 1.** Main difficulties detected for the implementation of an IMS-QES

**Source:** Rebelo (2011)
with their resulting empowerment; the improvement of partnerships with suppliers of goods and services and dialogue with the main stakeholders and commitment to their ongoing satisfaction and increased contribution to the company’s competitiveness.

3.1 Integration and operation of IMS-QES – approach to structuring to the IMS model

The literature is clear about the importance of the integration of Management Systems. But literature on how to organize this integration is generally lacking (Asif et al., 2010). Traditionally, the management of quality, environment and safety aspects is seen to be fragmented and spread across separate personnel and managers. An IMS tends to integrate some or all components of a business in one coherent Management System. According Santos et al. (2011) the compatibility among different standards for the effective integration of the different systems should be done in moderation. For this to happen, it is very important to ensure that there is not a strong/rich group of organizations leading a large platoon of organizations with greater difficulties to implement/manage their Integration of Management Systems.

According to Rasmussen (2007), there is no a single international standard for IMS and according to Salomone (2008) and others authors like, Karapetrovic and Casadesus (2009) and Beckmerhageni et al. (2003), several countries like Australia and New Zealand – AS/NZS 4581:1999 (Australian and New Zealand Standard, AS/NZS 4581:1999, 1999); England – PAS 99:2012 (BSI, 2012); Spain – UNE 66177:2005 (AENOR, 2005); Denmark – DS 8001:2005 (Dansk Standard, 2005); New Zealand; France; the Netherlands, have developed or are in the process of developing their own national standards on IMS, encompassing various references, functions of the organizations and stakeholders. They are based on the model of processes, with focus on the business strategy and on the expectations of the stakeholders. They also suggest other approaches and possible integration methods.

The model for an IMS in accordance with DS 8001:2005 (Dansk Standard, 2005) is mentioned by Jørgensen (2008). However, other IMS models are referenced or presented

---

**Source:** Rebelo (2010)
by other authors, such as Arifin et al. (2009), Zeng et al. (2007), Tsai and Chou (2009), Santos et al. (2011) and Asif et al. (2011). According to Rasmussen (2007), the common elements/requirements of the different standards maybe identified using ISO (2001) Guide 72.

3.2 Compatibilities between the requirements of the ISO 9001 (ISO, 2008); ISO 14001 (ISO, 2004) and OHSAS 18001 (BSI, BS OHSAS, 2007) standards which enhance the integration
According to the ISO (2001) Guide 72, Guidelines for Justification and Development of Management System Standards, the MSS must take into account that the corresponding Management Systems can consider the following phases of the PDCAI cycle – Plan, Do, Check, Act and Improve: policies and principles; planning; implementation and operation; performance assessment; improvement; management review.

A methodology for integrated use of MSS (Vrassidas et al., 2010) has been proposed by ISO (2008) with the publication of “The integrated use of management system standards”, while several authors (Karapetrovic and Jonker, 2003; Beckmerhagen et al., 2003; Pojasek, 2006; Jørgensen et al., 2006) have presented their approach for efficient integration of management sub-systems. As far as it concerns the degree of management sub-systems integration in an organization, several scholars have proposed various theoretical approaches, leading to the conclusion that there is not a common practice for all organizations, as they encompass different characteristics.

Within this framework, taking too into account the structuring of standards – management responsibility/planning; resource management; product realization/operational control and measurement, analysis and improvement, one of the activities that forms part of the scope and objectives of this study to which we have paid particular attention is the compatibility of the requirements of the standards, in context and framework of the characterization of the organization’s situation, backed up by an analysis of these standards. This compatibility represents, at our understanding, the starting point for consequents activities of integration, simplification and optimization, to achieve a level of the strictly necessary and consequently the three sub-systems – QMS, EMS and OHSMS are integrated to the maximum extent possible. At the matrix of the Figure 5 are shown the requirements of the ISO 9001 (ISO, 2008), ISO 14001 (ISO, 2004) and OHSAS 18001 (BSI, BS OHSAS, 2007), as well as, we have established correspondences, made them compatible with each other and associated with the phases of the PDCAI methodology – “Plan-Do-Check-Act-Improve”.

With this matrix, we aim to orientate and align the organizational structure of the organization in the same direction – the direction of the continuous improvement of the global performance of the organization, that shall be an objective always present in the development of an IMS (Rebelo, 2011). At the same time the matrix constitutes a structured and useful work referential to support an effective alignment and correspondence of the Sub-Management Systems of Quality, Environment and Safety with consequent compatibilities between each other, for consequent implementation of the IMS-QES. From this matrix we can also, at the same time, to made a correspondence with the Deming Cycle, in this circumstance for the IMS, as well as a set of stages (1.1; 2.1…2.4; 3.1…3.7; 4.1…4.6 and 5.1) associated with each other these phases of the PDCAI cycle.

3.3 IMS-QES – the approach
The continuous improvement of the global performance of an organization shall be an objective always present in the development of the IMS. The organization should
therefore potentiate for each stage: plan, do, check, act, improve, a careful and methodical analysis of the differences that effectively can be observed in terms of standards requirements under clauses equivalent involved and for each phase and each stage of development of the IMS-QES.

In line with this principle, the integration was developed in a natural and evolutionary way through an inclusive approach. This leads to process-based integration and deployment, as per the IMS-QES schematization shown in Figure 3, which from is now coherent with the three referred standards. An integrated QES Management Manual replaces the three existing manuals, in which the contents of references were crossed with the paragraphs of the related MSS.

The boxes on the right side of Figures 3 and 4 represent the different Management Systems that are Quality (Q), Environment (E) and Safety (S). According to Figure 5, there are items that can be integrated, for example, items of Quality and Environment (QE) or items of Quality and Safety (QS), or items of Quality, Environment and Safety (QES). The items that are integrable are represented in the referred figures by overlapping areas, for example, QE, or ES or QES. There are items not integrable which are represented without overlapping areas, for example, Q or E.

So, first of all, the definition, approval and communication of the integrated management policy, a common requirement to the different normative references, which must take into account and be consistent with the mission and vision of the organization, these supported on a strategy and specific objectives which in turn, support the implementation of that policy and its consequent effectiveness.

The planning of activities in the aim of the IMS – Phase I (Plan) – is perhaps the most important. In fact, a neglected planning will lead to inefficiencies that can be translated into potential deviations to the objectives. It is therefore fundamental to invest resources and expertise at this stage, via a thorough and careful work, in order to respond effectively to all requirements arising from the involved standards and others applicable requirements in this phase of the planning of the IMS.

Following is the Implementation and Operation – “Do”, the organization should, in this Phase II – Do – promote, the “Make/Do” in coherence with the pre-planned. Corresponds mainly to clauses: 7 – Product Realization, of ISO 9001 (ISO, 2008) – and 4.4 – Implementation and operation of the OHSAS 18001 (BSI, BS OHSAS, 2007) and ISO 14001 (ISO, 2004) and in the case of ISO 9001 (ISO, 2008) should be considered associated with the product realization, other complementary clauses,
particularly in context of resource allocation (6.1, 6.2, 6.3, 6.4) and management commitment (5.1, 5.5.1).

In the Phase III – Check, we identified six steps (4.1-4.6) designed to meet the requirements of clauses: 8 – Measurement, analysis and improvement of ISO 9001 (ISO, 2008), 4.5 – Checking of the ISO 14001 (ISO, 2004) and OHSAS 18001 (BSI, BS OHSAS, 2007). With the exception of step 4.3 – Investigation of incidents resulting from a specific sub-section, the 4.5.3.1 – incident investigation, the OHSAS 18001 (BSI, BS OHSAS, 2007) has no correspondence in the ISO 9001 (ISO, 2008) and ISO 14001 (ISO, 2004).

At the end, in the Phase IV – Act, we identified the step 5.1 – Critical analysis and combined review of the QES-MS, which refers to the requirements of clauses: 5.6 – Management review of the ISO 9001 (ISO, 2008) and 4.6 – Management review of the ISO 14001 (ISO, 2004) and OHSAS 18001 (BSI, BS OHSAS, 2007).

On this IMS-QES proposed model we included in its structure as presented in the Figure 4, five fundamental components: Integrated Management Policy and Objectives; Organizational Structure and Resources; implementation and do the IMS-QES operational; monitoring of processes and products; assessment, continuous improvement and innovation, and its corresponding guiding principles and action, as described in the list below. It is a model that we consider dynamic, configured as a process, also supported on the PDCAI cycle, which re-feeds, both in terms of corrections and/or continuous improvement any of its five components.

Guiding principles and action of each one of the five principal components of the proposed model of IMS-QES (Rebelo, 2011) is given below:

(1) The top management shall demonstrate strong commitment leadership and personal involvement by defined Strategy, the Policy, Objectives and Targets for Quality, Environment and Safety, as well as, to turn available all the needed resources to achieve the objectives.
The Strategy, Policies, Objectives and Targets for Quality, Environmental, Safety and other aspects must be defined and documented by the Management, and should be disclosed and communicated to all levels of the organization and to other stakeholders as applicable.

(2) All needed resources to meet the objectives shall be determined and have to be provided. Actions, responsibilities and authority, within the scope of the IMS-QES shall be defined and clearly communicated.

(3) The different activities of the organization shall be set out as processes and put into operation, as per the applicable requirements, in order to strictly comply with the Policies and the instructions, whether they are documented or not, such as, to ensure that the organization's objectives and targets are achieved and the different stakeholders are satisfied.
All of the organization's activities involve risk. The identification of hazards and the assessment and minimization of the associated risks are aimed to mitigating the impact of operations, specifically those with impact on Quality, Environment and Safety of Collaborators and Users of the Organization's products, infrastructure and the business itself.

(4) Critical information in the aim of the IMS-QES shall be identified, collected and analyzed. Consistent with the QES policy and the commitment to the compliance, the organization shall establish, implement and maintain
documented records to demonstrate the improvements and compliance with all the applicable internal and external requirements.

The use of KPIs to monitor the processes, their control and continual improvement shall be made systematically and guaranteed by the process owners, through the active involvement and participation of collaborators.

(5) The top management should ensure processes of assessment, improvement and innovation on the different components of the IMS-QES, supported namely by:

- Internal and external combined audits of the different components and areas of the IM-QES, including suppliers and sub-contractors, shall be scheduled at a frequency that takes into account the risk of the business. It must be conducted to assess the level of implementation and compliance of the system, its evolution, effectiveness and potentiate the identification of the necessary corrections and opportunities for improvement, which must be listed and prioritized on its evaluation and implementation.
• Management reviews to the IMS-QES, which shall be conducted at planned intervals, to identify opportunities for improvements, to assess the need for alterations to the Management System and to the Integrated Management Policy, to ensure that it continues to be appropriate, suitable, effective and efficient.

• An internal system of ideas that by evolving all the collaborators and encompasses the organization, as a whole, at all levels of its organization, operation, products and services. In the aim of the relationships with stakeholders, encourage a Culture of Improvement through innovation.

Thus, arising from Figure 5, more specifically, items, such as Integrated Management Policy and Objectives (1.1), and others four items, are integrated in the model in Figure 4 as follows:

(1) Integrated Management Policy and Objectives (1.1) – first of all, the definition, approval and communication of the Integrated Management Policy, a common requirement to the different MSS references, which must take into account and be consistent with the mission and vision of the organization, these supported on a strategy and specific objectives and goals, for each Department, which in turn, support the implementation of that policy and its consequent effectiveness;

(2) organizational structure and resources (2.1; 2.2; 2.3 e 2.4) – planning of the IMS in line with the commitments associated to the Integrated Management Policy in view the objectives and goals QES;

(3) implementation and operation of the IMS-QES (3.1; 3.2; 3.3; 3.4; 3.5; 3.6; 3.7) – implementation and operation of the IMS at the level of the QES programs observing lean thinking principles;

(4) monitoring of processes and products (4.1; 4.2; 4.3; 4.4; 4.5; 4.6) – verification and evaluation of the IMS at the level of the evolution of performance results of the quality, environment and safety. Corrections, corrective actions and preventive actions; and

(5) assessment, continuous improvement and innovation (5.1) – management review, audits, ideas (that by evolving all the collaborators and encompasses the organization, as a whole, at all levels of its organization, operation, products and services) for the continuous improvement and coherent development of the IMS-QES and sustainable success of the organization.

It is an innovative model, which allows us to continue to “build the puzzle” through a progressive integration and more wide-ranging of different MSS. Hence the proposed IMS-QES model is configured as a process and also supported, as the referred national standards on IMS (Australia, England, New Zealand, France, The Netherlands, Denmark and Spain), on the Deming Cycle and the ISO guidelines for writing MSS. It is a simple and innovative model, which allows us to promote a progressive integration of a more wide-range of different MSS, considering the evolution of the internal and external organizational environment. At the same time the presented model promote the sustained success of the organization, namely in line with the ISO 9004:2009 (ISO, 2009) principles. Each one of the five principal components of the model has associated guiding principles to support on the identification and how working with
the common requirements of the considered MSS. At same time, the model facilitates, inducing the identification and integration of two or more Management Systems into one coherent and efficient IMS with a holistic set of documentation, processes, KPIs and procedures.

The model emphasize relevant aspects of the modern management of the organizations like the risk management, information security, innovation, empowerment, sustainability and stakeholders relationships. The model encourage the organizations to adopt and implement in an integrated way others MSS, like the

4. Conclusions
The organizations are permanently under a progressive pressure considering the crescent globalization of the businesses and the associated diversification of requirements of the stakeholders vs related MSS. The real need of integration of several sub-Management Systems is a fact in this context and a generic model of IMS is potential area for investigation.

The continuous improvement of the global performance of organizations must be always a present goal in a perspective of sustainability. The developed model of the integration of the individual Management Systems – quality, environment and safety at the organization should therefore to potentiate, for each phase: Plan, Do, Check, Act, Improve a careful and methodical analysis of the differences that effectively are observed at the level of the related MSS requirements under the equivalent clauses and for each step of their development as the advocated model of integration.

From the analysis of the normative requirements vs the similarities of the elements of the ISO 9001:2008 (ISO, 2008); ISO 14001:2004 (ISO, 2004) and OHSAS 18001:2007 (BSI, BS OHSAS, 2007) that promote the integration and his formatting on a Matrix of compatibilities were established correspondences. It was one of the activities that in the scope and objectives of the integration model was given special attention in the context of the characterization and framework of the situation in the organization.

Compatibilities constituted the starting point for subsequent activities of integration, simplification and optimization, to a level of the strictly necessary. The consequent integration was maximized as desired of the three sub-systems – QMS, EMS and OHSMS, in context of strong competitiveness.

The result of integration is an IMS-QES that represent added value both in the present and, fundamentally, for the future, not only for the organization, as well as, for a whole range of stakeholders. They are examples, also highlighted by the survey respondents: the elimination of conflicts between individual systems with optimization of resources; the improvement at the level of the coordinated and Integrated Management of the Risk Associated to the Safety of the Persons and Organization Assets, Quality of the Products and Environment; the reduction of the number of internal and/or external audits and audits to suppliers spent time vs associated costs; the creation of added value for the business through the elimination of several types of waste.

The model is simple and can be considered to be adopted by several other organizations in different areas of activity of different dimensions and market position.

References


**About the authors**

Dr Manuel Ferreira Rebelo did a five-year Degree in Electrical Engineering at the University of Oporto. He has also completed several postgraduate courses including quality engineering at the New University of Lisbon, – Executive MBA, Master of Business Administration in Commercial Engineering and Management at IEP/ESADE – Instituto Empresarial Portuense/Escuela Superior de Administración y Dirección de Empresas; – Post Graduation in Occupational Health and Safety (2002-2003) by the Lusíada University of Famalicão (2002-2003), among many others. Currently he is a PhD student at the Lusíada University in Portugal. Manuel presently develops research activities in IMS – Integrated Management Systems and Sustainability of the Organizations, supporting it in IMS’s and in the GRI Sustainability Reporting Guidelines. He is a professional with a wide-range of management skills, strongly committed to global quality and its continuous improvement. He is positioned on the best practices at the level of individualized and/or Integrated Management Systems. Manuel began his career as teacher in the areas of energy management and quality assurance, participating in the national and international evolution of the current standards of Management Systems, in a perspective of sustainable development. Expert in the implementation and integration of management of quality, environment, OH&S, social responsibility, among others. Manuel participates as a speaker in several conferences and he is currently co-author of several publications in integrated Management Systems (IMS) – QES (Quality, Environment and Safety). He has 30 years of expertise on the management and co-ordination of the implementation of Management Systems and its certification regarding the ISO 9001; ISO 14001; OHSAS 18001 (BSI, BS OHSAS, 2007) and ISO/IEC 17025 requirements. He has an official qualification as Auditor QES according to ISO 9001; ISO 14001 and OHSAS 18001 (BSI, BS OHSAS, 2007). In June 2011, Manuel received the badge of silver after 25 years as a member of APQ – Portuguese Association for Quality. He is an effective member of the Portuguese Engineer Association.

Professor Gilberto Santos graduated in Mechanical Engineering from the Slovaks Technical University. He completed a postgraduate course in quality engineering at the New University of Lisbon and he received a PhD in mechanical engineering – production technologies (branch – industrial quality) from the University of Minho. Gilberto has worked in the mechanical engineering departments at the New University of Lisbon and the University of Minho. He founded a master’s course “Integrated Management Systems QES (Quality, Environment and Safety)” at the College of Technology of Polytechnic Institute Cavadão e Ave where he is a Professor from 2006 and the Director of the MSc from 2008. Gilberto participates as a speaker in several national and international conferences and he is currently author of several publications.
in Integrated Management and Systems Quality, Environment and Safety in international and national journals. He is member of the research team of several IMS – QES research projects and also supervises master and PhD thesis and also serves as a reviewer for international journals. In 2004, Gilberto became a “senior member” of the Board of the Portuguese Engineer Association and in 2006, he was distinguished by Yorker International University with the Honorary Doctorate of Mechanical Engineering – “has walked an exceptional path of Professional life and is the perfect candidate for such degree”. In 2011, he received the badge of silver by the 25 years as a member of Portuguese Engineer Association. Professor Gilberto Santos is the corresponding author and can be contacted at: gsantos@ipca.pt

Rui Silva is an Associated Professor in the Engineering and Technology Faculty at the Universidade Lusíada de Vila Nova de Famalicão, Portugal. He holds a PhD degree in Mechanical Engineering from the University of Glamorgan, UK. His current research interests include industrial management, operations management and artificial intelligence. He is Cofounder and Principal Investigator of the Engineering and Industrial Management Research Centre since 2006. He is the head of the Engineering and Technology Faculty since 2008.