XVIII ICIEOM 2012
International Conference on Industrial Engineering and Operations Management
Guimarães - Portugal
July 9 - 11, 2012

Articulation between Information Systems and Quality Management Systems – Literature Review

Sílvia G. G. Ferreira*, João A. Carvalho*, Paulo Sampaio+

* Department of Information Systems, School of Engineering, University of Minho, Azurém, 4800-058 Guimarães, Portugal
+ Production and Systems Department, University of Minho, 4710-057, Braga, Portugal

Email: silviaggf@gmail.com, jac@dsi.uminho.pt , paulosampaio@dps.uminho.pt

Abstract

Technological advancement has influenced all aspects of daily life. Since the adoption of Information Technology (IT) / Information Systems (IS), that represents the key issue for the success of most organizations, management of the quality of its products, services and business processes with established quality certification under ISO 9000, also represents a critical aspect in organizations. Organizations are forced to use advanced technologies and become more efficient in internal organization in order to be more competitive and closer to their customers and partners. In the face of increasingly demanding markets, interventions for organizational improvement through the adoption of quality management are becoming very common.

The organizations are concerned with the development and implementation of information systems tailored to their specific needs, rather than buying in the market software applications. By the other hand, organizations acquire software certificates on the market to meet some specific requirements of the Quality Management Systems (QMS), such as auditing and document management.

Synergies between the IS and QMS according to ISO 9001 standard, allows the association between these two systems, so that the IS can support and influence the processes related to the QMS, not only limited to the collection and documentation management. The joint development of these systems allows organizations to use only a methodology and a team intervention.

The potential benefits of active participation of the organizational processes associated with the IS / QMS raises the need to develop a method that articulate/integrate interventions for improvement motivated by IT / IS with the improvement interventions motivated by the QMS.

Keywords: Information System; Quality Management System; ISO 9000, Synergy.

1 Introduction

External forces, such as globalization, more demanding customers, trade barriers reduction, IT and other innovations, have increased the rhythm of competition between organizations, and have changed the way that they are planned. The emergent change management approach, has become an increasingly popular approach in organizations. It becomes crucial for the organization to develop excellence in their adaptive capability, to understand what is going on and how to respond to changes (Biedenbach and Soderholm, 2008). According to these authors, new product development, business processes reengineering, fusion of organizational divisions, expanding the business to another location or new market and IT implementation, are some examples of change efforts. These efforts, involve a re-appraisal of structures, systems and processes, and serve to better understand the nexus between these elements including how they impact on workplace practices (Graetz and Smith, 2005). With increasing globalization of markets and policies, organizations must find ways to increase productivity and improve performance at all levels, so as to continuously create new sources of competitive advantages to mitigate the advantages of its competitors (Biedenbach and Soderholm, 2008).

IT/IS represent the main motor of the business and organizational base (Željka, 2006), and functions as a catalyst for organizational change (Abraham and Junglas, 2011). On the other hand, the adoption of QMS

according to ISO 9001, represent an increasingly decisive factor for organizations negotiate at a global level (Figueiredo and Cunha, 2005). Both system are organizational change efforts that require an intensive strategic analysis and requirements engineering, but systematically are analyzed and implemented with independent efforts, different teams and implementation methodologies (Figueiredo and Cunha, 2005).

The feasibility and usefulness of the research topic, it is founded by the need to articulate the implementation of these two systems in organizations. The aim of this paper, is to reflect issues related this articulation: (i) the adoption of IT/IS, (ii) the adoption of QMS according to ISO 9001, (iii) the potential synergies between IT/IS and QMS and (iv) the integration of these two systems. The purpose is to justify through a literature review, the need to develop a method that articulate/integrate interventions for improvement motivated by IT/IS with the improvement interventions motivated by the QMS.

The paper is organized as follows: section 2, is related to the adoption of IT/IS in organizations. In Section 3 is stated a reflection on the adoption of QMS according to ISO 9001. The potential synergies and integration between IT/IS and QMS, is presented in Section 4. Finally, section 5 is composed by the main conclusions reacted so far.

2 Adoption of Information Technology / Information Systems

Organizations are constantly adapting to changes in their environment. These changes tend to be dramatic, because they interfere with standards, processes, structures and even the strategic goals of organizations (Zaidan and Jamil, 2009).

Organizations are forced to use advanced technologies and more efficient processes to be more competitive in the global market (Željka, 2006). According to these authors, the survival of the organization depends on the use of efficient and customized IT, that satisfy the specific needs and requirements of the organization.

Osterle (1995), apud Željka (2006), refers that the use of IT, allows the organization to efficiently use all available resources, as well as to adjust to and to change their internal processes according to the market conditions, seizing business opportunities.

When an organization decides to adopt some IT application, it must define the objectives it wants to achieve (Lee, Lee and Kang, 2008), carefully plan each step of the implementation, and evaluate the results achieved during and after the implementation process (Željka, 2006). Ferrat, Ahire and De (2006), apud Lee, Lee and Kang (2008), refer that it is easier the business processes to adapt to the ERP system implemented, when the objectives are predefined by the organization.

The organizational change efforts motivated by IT adoption have been an perplexing topic among authors (Devadoss and Pan, 2007; Crowston and Myers, 2004). Abraham and Junglas (2011), describe how the IT adoption process contributed to organizational transformation in a business context that is rapidly moving to the center stage of societal importance. The analysis made to the IT adoption process, suggests that the process itself, isn't just the result of an artifact, as it also contributes to organizational change, in terms of changes in the coordination, culture and learning: (i) Linking the IS implementation with the organizational strategy forefronts the need and requirements for information interdependence and efficient processes to bring about changes in coordination; (ii) The planning strategy that stresses collaboration and involvement of all stakeholder is foundational for changes to come in professional and organizational culture; (iii) The analysis of problems collectively amongst stakeholders, uncovers role and process transparency that needs to be addressed to change culture; (iv) Process-re-generation is an opportunity for educating and raising the collective acumen to promote changes in learning and (v) Improvement is an opportunity to: ensure the appropriateness of the process owners for enhanced coordination; deter complacency or reliance on the system as a complete replacement for needed communication for enhanced coordination; understand the limitations of codification of data and

compromise system requirements to afford better data analysis and provide a means for enriched and continual learning that can be the basis for innovation.

Lee, Lee and Kang (2008), report that the process of implementing an ERP system goes beyond the computerization of existing processes in the organization. It is also necessary to change them to understand what are the true benefits of implementation. The implementation of an ERP system represents the most important factor for organizational success. However this successful depends mainly on factors intrinsic to the organization, such as: adequate support in the project development, continuous improvement of business processes and especially the commitment and involvement of all employees of the organization.

Edmondson, Bohmer and Pisano (2001) and Davenport (1998), apud Abraham and Junglas (2011), share the same opinion: IT adoption processes require great effort by all executive leadership, especially by all professional levels (from top managers to line operators). In fact, one of the success factors in implementing ERP systems is the participation and involvement of all users.

The strong and consistent support from top management in planning the implementation of the ERP system and the promotion of teamwork, provides the project success (Berchet and Habchi, 2005). According to the study of these authors, the implementation project allowed a strategic vision of business, achieve organizational efficiency, respond to changing needs and grow the business, increasing productivity and competitive advantage.

The question of competitive advantage through the IS implementation process, is a matter that merits attention both in the academic field as in the professional field of SI. This question is especially relevant in the case of ERP systems, since they are software packages (Anderson, Banker, Menon and Romero, 2011). Davenport (1998), referenced by this autors, consider that if all organizations can buy the same software package, the software alone doesn't confer a competitive advantage. The issue of organizational fit, defined by Hong and Kim (2002), should be taken into account, before of the IS implementation in organizations. The organizational fit, represents the level of alignment between the existing software package and organizational needs in terms of data, processes and users. Only one IS appropriate to the organization can effectively support the business processes and provide competitive advantage (Anderson, Banker, Menon and Romero, 2011). The IS implementation process resulted from the need to promote synergies and integration between internal resources and existing systems, in contrast to initial strategy of the organization's business focused on the acquisition of a multitude of different environments in your area of action (Abraham and Junglas, 2011). According with this autors, a proactive behavior in the IS implementation process, is the behavior that the organization should have to take existing opportunities. It reflects in organization activities, such as (i) understanding the information interdependence; (ii) rationalize the processes; (iii) redefine the tasks to an appropriate procedure; and (iv) promote the SI as a substitute for communication that synthesizes the verbal and nonverbal.

The implementation time of a process of SI, the costs of hardware and software licenses, the dysfunctions of a different nature in the launch of the operating system, fear and rejection of the system by users, are reasons why the contribution of the implementation of these systems is not achieved in the organization with the necessary antecedence (Berchet and Habchi, 2005). Although, the adoption and diffusion of new business processes through the implementation process of ERP system is a complicated task, because of resistance by the workers accustomed to previously existing processes, opens the question innovation in the organization rather than to ignore (Lee, Lee and Kang, 2008), and reflected in an innovative business strategy involving the improvement of business processes (Berchet and Habchi, 2005). The endless cycle, to optimize the effective use of IS, takes the organization to create innovative activities to redefine processes that previously failed. These new activities translate into new services and are an impetus for innovation. According to the study Abraham and Junglas (2011), the approval of the IS implementation process, wasn't initially due to financial returns but due the need for organizational progression.

The organizational change should be structured in terms of models or processes of change. Abraham and Junglas (2011), used the business process change model (BPCM), to describe the steps followed in IS

implementation and to structure the insights that resulting of the applicability of each of these steps, while Berchet and Habchi (2005), proposed a five-stage deployment model: (i) selection of the vendor and software; (ii) deployment and integration; (iii) stabilisation; (iv) progression and (v) evolution.

3 Quality Management Systems according to ISO 9001

The quality of manufacturing products has become one of the most important factors that influence national and international business and economic patterns. Numerous quality standards have been developed and adopted over the years, with the ISO family of standards representing an international consensus on good management practices with the aim of ensuring that an organization can deliver products or services that meet the customer's quality requirements (Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006). ISO 9000 standards, appears initially, by the necessity of building trust between suppliers and manufacturers in business transactions and international trade (van der Wiele, Iwaarden and Williams, 2005). The aim is to facilitate the international exchange of goods and services and develop cooperation in the fields of intellectual activity, scientific, technological and economic (Bhuiyan and Alam, 2005). Since that, the ISO 9000 family was issued, it is unlikely that any other standards had more impact on international trade, on the relationship between suppliers and their customers and on the management of quality (Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006). The ISO 9000 standards help organizations to follow specific procedures, which are well documented in the preparation and/or delivery of products or services. These procedures, shall be those deemed necessary to make the products and / or services of an organization in accordance with customer specifications (van der Wiele, Iwaarden and Williams, 2005).

The ISO 9000 standards are highly prescriptive, specifying minimum requirements that an organization must meet in order to provide confidence that their processes are consistent (Lambert and Ouedraogo, 2008). When the organization proves to an independent audit entity that complies with the prerequisites of this standard, occurs the certification (Figueiredo and Cunha, 2005). These authors mention that ISO 9001 distinguishes between the organization "certified" and "accordance". In this latter situation the organization implements the ISO 9001 standard only for the benefits it brings without necessarily seek certification by a third entity. However, when the decision to implement the ISO 9001 standard is imposed by a big customer the certificate becomes an end in itself and the organizations can spend a lot of money and efforts without necessarily obtain improved products and better results (Lambert and Ouedraogo, 2008). If the adoption of ISO 9001 represents only a demand from customers, the top management may be tempted to apply it in a superficial way, thus producing minimal disruption in the organization, forgetting the internal potential benefits and implications that comes with certification. The ISO 9001 standard becomes an end in itself instead of being a management tool that aims to promote quality practices (Boiral and Roy, 2007). The organization should plan and implement the QMS in order to benefit from all internal and external advantages that comes from certification.

The reasons for the adoption and implementation of a QMS according to the ISO 9001 standard, are pointed out by some authors: (i) The adoption of a QMS according to the requirements of ISO 9001, should be a strategic decision of an organization (Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006); (ii) One of the methods used by modern organizations to compete with its competitors that operate in different parts of the world, is the implementation of a QMS according to the requirements of ISO 9001 (Magd, 2006); (iii) The adoption of a QMS according to the requirements of ISO 9001 as an opportunity to obtain international recognition and establishment of the trade (Sakthivel et al, 2008); (iv) The main objective through ISO 9001 quality system implementation is to satisfy customers, while the development of knowledge and innovation is not a really main objective for most organizations (Lambert and Ouedraogo, 2008); (v) The decision to obtain a quality certificate, arises from the need to find a new source of competitive advantage through quality (Viada-Stenger, Balbastre-Benavent and Redondo-Cano, 2009) and (vi) The adoption of a QMS according to the requirements of ISO 9001, for better service and operational performance (Chen, 2011).

The process of implementing a QMS according to ISO 9001, involves changes in the organization and requires involvement and commitment of the company top management. If this support doesn't exist, organizational changes won't create the necessary roots and won't be considered a priority to guide the organization to reach the benefits of this implementation (Viada-Stenger, Balbastre-Benavent and Redondo-Cano, 2009). Top management performs a fundamental role in ensuring that the QMS is applied in the organization as initially planned (Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006) and must be conscious of the basic and essential aspects of the process of implementing a QMS. The lack of involvement and commitment of the company for QMS implementation process is appointed as the main cause of failure associated with this type of project (Viada-Stenger, Balbastre-Benavent and Redondo-Cano, 2009).

The organization should be consciously of the problems that comes from implementing a QMS according to ISO 9001, and consider changes in the organization at different levels, such as:

(i) Changing the cultural level - requires the involvement and compromise of members of the organization, which means that all employees, no matter their place in the hierarchy are informed about the organization's goals and policies related to quality in order to be motivated to play an active role in this change (Viada-Stenger, Balbastre-Benavent and Redondo-Cano, 2009);

(ii) Changes at the structural level - the ISO 9001 promotes the adoption of the process approach, to developed, implement and improve the QMS implemented. While a traditional structure organizes and manages work activities vertically by function, with quality problems frequently occurring at the boundaries of the functional departments, the process approach organizes and manages work horizontally (Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006), so ensure that the organization determines the processes needed for the QMS, as well as the resources, information, criteria and methods needed for its management (Figueiredo and Cunha, 2008).

(iii) Changes the coordination level - the organizational management must ensure that each department of the organization has a clear vision of the organizational mission and of the business strategy in order to facilitate cooperation between different areas. The business strategy and objectives of the strategy ensures that all initiatives of different departments are constantly guided and coordinated by a shared purpose (Viada-Stenger, Balbastre-Benavent and Redondo-Cano, 2009).

(iv) Changes the learning level – the first implication of ISO 9001 implementation is the codification of knowledge. Employees are invited to describe their practices and knowledge (Lambert and Ouedraogo, 2008). The lack of experience and knowledge in relation to ISO 9000 and the implementation of a QMS by the organization is overcome through training programs to understand the actual process of day-to-day (Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006). The learning of the norm makes the operational skills are more visible in the organizations processes (Lambert and Ouedraogo, 2008). The training includes: a general understanding of the vocabulary of ISO 9000, the role played by the records and document required by the QMS, individual responsibilities and benefits derived from implementation of the QMS (Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006).

The implementation of a QMS according to ISO 9001 allows us to distinguish three types of processes in the organization: (i) Management processes - to define the strategic direction of the organization, establish quality goals and policies and implements them throughout the organization (processes, leadership, human resource management, business strategy, planning, organization, coordination and quality management); (ii) Realization processes - operating to amount of the value chain in the detection of the needs of the customer and then, the product realization ending downstream in customer satisfaction. This type of process is the heart of the business organizations (examples of processes, markting, design, production and delivery); (iii) Support processes - to provide necessary resources, such as human, material and financial resources for other processes (processes, logistics, IT, maintenance, testing and measurement equipment). In each type of process, learning occurs (Lambert and Ouedraogo, 2008). The right resources are the basic requirement for implementing a QMS, as well as people, facilities and equipment (Bust, 2011).

Figure 1 presents the model of a QMS based on process approach:

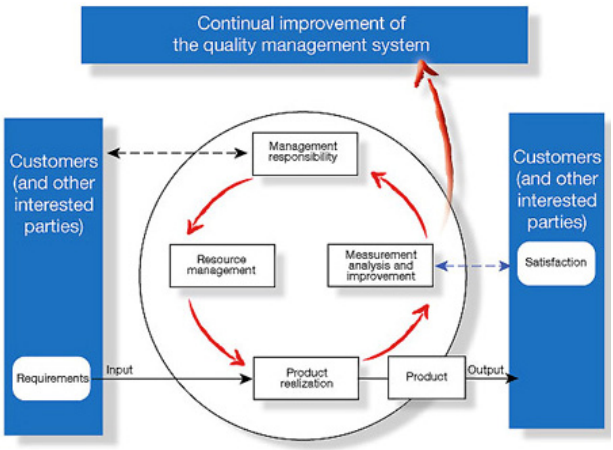

Figure 1: Model of QMS based on process approach. Source: Adapted from EN ISO 9001:2008. (ISO, 2008).

The use of a process approach emphasizes the importance (i) of understand and meet customer requirements, (ii) the need to consider processes in terms of added value, (iii) to obtain performance results and the effectiveness of processes, and (iv) of the continuous improvement of processes. The model illustrates the interconnection of different processes according to ISO 9001: (i) QMS; (ii) Management responsibility; (iii) Resource Management; (iv) Product realization and (v) Measurement, analysis and improvement.

4 Synergy and Integration between IS and QMS

The implementation of a IS and a QMS according to ISO 9001 are catalysts for changes in the organization at different levels, as mentioned in sections 2 and 3. Both systems are complex, involving profound changes in the organization (Figueiredo and Cunha, 2005). The decision to implement these systems must be consistent and reasoned in order to achieve the organizational success (Zaidan e Jamil, 2009; Viada-Stenger, Balbastre-Benavent and Redondo-Cano, 2009; Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006). The IS implementation in an organization involves technological aspects because its existence depends on the technology in terms of hardware and software (Figueiredo and Cunha, 2005), to aggregate resources for data processing, and generate information for customers, suppliers and users (Zaidan and Jamil, 2009). However the implementation of a QMS according to ISO 9001 doesn't require the use of technology. None information management system is mentioned in chapter 4 of the ISO 9001 standard. Just the clause 4.1 - General requirements, point d) of this chapter, mentions the necessity of providing information to support the operation and monitoring of the processes included in the QMS (Sakthivel et al, 2008). But according to these authors, the development of an information management system could act as a lever mechanism to improve the performance of the aspects required in chapter 4 of ISO 9001, to providing organizations synergistic benefits between technologies and ISO 9001. Both systems consider the human dimension as key elements for reaching their success. The existence of this systems depends on the needs of each organization, which are made by people that exert influence on them (Figueiredo and Cunha, 2005).

While IS implementation process it is important to know the organization strategy, the QMS implementation process depends directly on the mission and objectives of the organization (Figueiredo and Cunha, 2005). The implementation of an IS should be aligned to organizational strategy, providing the interaction between all the functions of the organization (Zaidan and Jamil, 2009), and the process of implementing a QMS according to ISO 9001 represents the best management practices for the organization to ensure that the organization provides products / services that meet the quality requirements demanded by customers (Aggelogiannopoulos, Drosinos and Athanasopoulos, 2006).

The detailed analysis of ISO 9001 allows one to more some conclusions concerning the possible association of the IS with QMS, including the compatibility of the requirements of the standard with the existence of an IS. The concepts of "product" and "clients" are used in the broadest sense of the ISO 9001 standard: the first includes services, software and hardware and processed materials, and the second, clients, employees, suppliers and shareholders (Figueiredo and Cunha, 2005). Both systems involve much more than technical issues, involve the organization itself, including tasks and management skills (Figueiredo and Cunha, 2008).

Figure 2 illustrates the vision of both systems that overlap in the thinking of these authors and the organization model based on process approach, according to ISO 9001 standard.

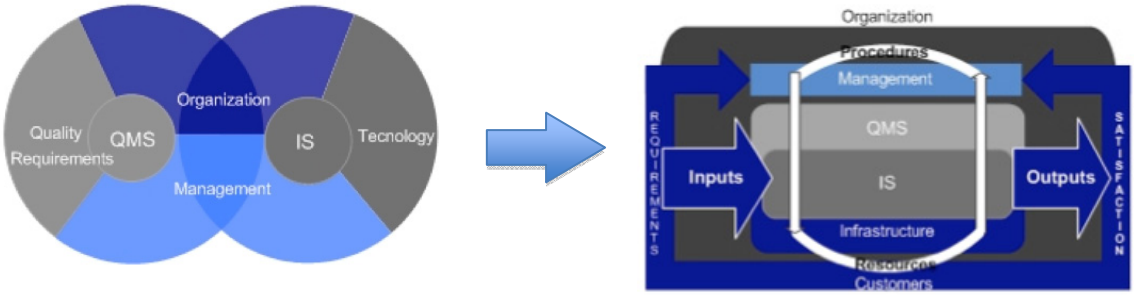

Figure 2: Main components of the QMS and SI, and Model of the organization based on process approach according to ISO 9000 (Figueiredo and Cunha, 2008).

Considering the process approach staked by ISO 9001 its possible to view the organization as a large-scale process or macro-process, where its activity by using a set of resources managed properly provides the processing of incoming and outgoing. The IS is both an infrastructure and part of the QMS organization, becoming the main vehicle for implementing the procedures of the organization. The information circulating in the organization is vital to regulate the functioning of both systems, and therefore it is logical that treatment occurs in a symbiotic way. The association of these two systems in the organization can occurs in one of the following scenarios: (i) Implementation of QMS, existing a IS, (ii) Implementation of IS, existing a QMS, and (iii) Implementation of the QMS and IS at the same time (Figueiredo and Cunha, 2005).

5 Conclusion

Organizations are forced to operate in a globalized and highly competitive market, where customers are demanding and mutable (Viada-Stenger, Balbastre-Benavent and Redondo-Cano, 2009). On the one hand, the IS represents a critical component of the backbone of organizations and on the other hand the quality management of products, services and business processes is a key issue for the success of most organizations when they operate in global contexts (Figueiredo and Cunha, 2008). The information circulating in the organization is vital to regulate the functioning of both systems, and therefore it is logical that your treatment occurs so symbiotic. Organization, IS and the QMS pursues common goals, provide a "product" and satisfy "costumers", which leads the association of these systems in a relationship of mutual benefits (Figueiredo and Cunha, 2005).

The organizational benefits of active participation of IS in the QMS processes, the synergies between the two systems, the lack of alignment between the development and implementation of a QMS with the SI and the lack of a joint project that allows the articulation between these two systems, so that they depend, supports and reinforce each other, justifies the problem explored in this article.

Considering this problem, reflect on issues relating to the relationship between IS and QMS, this article seeks to justify through of a literature review the need to develop a method that articulate/integrate interventions for improvement motivated by IT/IS with the improvement interventions motivated by the QMS.

The research project in progress is framed in the field of TSI and aims to search scientific contributions anchored in the following main research question: How to conciliate the organizational improvement interventions driven by IT/IS with organizational improvement interventions motivated by the SGQ?

Acknowledgments

This work is funded by FEDER Funds through the Operational Programme Competitiveness Factors – COMPETE and National Funds through FCT - Foundation for Science and Technology under the Project: FCOMP-01-FEDER-0124-022674.

References

Abraham, C. & Junglas, I. (2011). From cacophony to harmony: A case study about the IS implementation process as an opportunity for organizational transformation at Sentara Healthcare. Journal of Strategic Information Systems, 20(2), 177–197.

Aggelogiannopoulos, D., Drosinos, E. H. & Athanasopoulos, P. (2006). Implementation of a quality management system (QMS) according to the ISO 9000 family in a Greek small-sized winery: A case study. Food Control, 18(9), 1077–1085.

Anderson, M., Banker, R. D., Menon, N. M. & Romero, J. A. (2011). Implementing enterprise resource planning systems: organizational performance and the duration of the implementation. Information Technology Management. 12:197-212.

Berchet, C. & Habchi, G. (2005). The implementation and deployment of an ERP system: An industrial case study. Computers in Industry, 56(6), 588–605.

Bhuiyan, N. & Alam, N. (2005). An Investigation into Issues Related to the Latest Version of ISO 9000. Total Quality Management, 16(2), 199–213.

Biedenbach T. & Söderholm, A. (2008). The Challenge of Organizing Change in Hypercompetitive Industries: A Literature Review. Journal of Change Management, 8(2), 123–145.

Boiral, O. & Roy, M. J. (2007). ISO 9000: Integration Rationales and Organizational impacts. International Journal of Operations & Production Management, 27(2), 226-247.

Bust, L. (2011). The building blocks of a quality management system, experiences from South Africa. ISBT Science Series, 6(1), 26–29.

Chen, S.-H. (2011). The establishment of a quality management system for the higher education industry. Quality & Quantity.

Crowston, K. & Myers, M.D. (2004). Information technology and the transformation of industries: three research perspectives. Journal of Strategic Information Systems, 13, 5–28.

Devadoss, P. & Pan, S.L. (2007). Enterprise systems use: towards a structural analysis of enterprise systems induced organizational transformation. Communications of the AIS, 19, 352–385.

Figueiredo, S. & Cunha, P. (2005). Simbiose do Sistema de Informação e Sistema de Gestão da Qualidade na Organização: aplicação a um caso. VI Conferência Associação Portuguesa dos Sistemas de Informação. Bragança, 26, 27 e 28 de Outubro de 2005.

Figueiredo, S. & Cunha, P. R. (2008). Joint Design of the Information System and Quality Management System in an Organization: Theory and Illustration with a Field Case. Proceedings of ISO ne World Conference.

Graetz, F. & Smith, A. (2005). Organizing forms in change management: The role of structures, processes and boundaries in a longitudinal case analysis. Journal of Change Management, 5(3), 311–328.

Hong, K. K. & Kim, Y. G. (2002). The critical success factors for ERP implementation: An organization fit perspective. Information & Management, 40, 25–40.

IPQ - INSTITUTO PORTUGUÊS DA QUALIDADE – NP EN ISO 9001:2008 (2008). Sistemas de gestão da qualidade. Requisitos, (2nd ed.). Lisboa.

Lambert, G. & Ouedraogo, N. (2008). Empirical investigation of ISO 9001 quality management systems' impact on organisational learning and process performances. Total Quality Management, 19(10), 1071–1085.

Lee, C. K., Lee, H.-H. & Kang, M. (2008). Successful implementation of ERP systems in small businesses: a case study in Korea. Service Business, 2(4), 275–286.

Magd, H.A.E. (2006). An investigation of ISO 9000 adoption in Saudi Arabia. Managerial Auditing Journal, 21(2), 132-147.

Sakthivel, M., Devadasan, S.R., Vinodh, S., Raman, S. R. & Kalasalingam, A. (2008). Design and Development of ISO 9001:2000-Based Quality Management Information System.

van der Wiele, T., Iwaarden, J. V. & Williams, R. (2005), Perceptions about the ISO 9000 (2000) quality system standard revision and its value: the Dutch experience. International Journal of Quality & Reliability Management, 22(2), 101-119.

Viada-Stenger, M. C., Balbastre-Benavent, F. & Redondo-Cano, A. M. (2009). The implementation of a quality management system based on the Q tourist quality standard. The case of hotel sector. Service Business, 4(3-4), 177–196.

Zaidan, F. H. & Jamil, G. L. (2009). Decision aspects of Information Systems implementation as a source of competitive advantage: a comparative case study of information technology sector. 6th CONTECSI International Conference on Information Systems and Technology Management. 03-05 June, USP/São Paulo/SP.

Željka P., Hrvoje S. & Marija B. (2006). Effective Information Systems development as a key to successful enterprise. Management, 12(1), 65-86.