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The Challenges of the IS/IT Projects in the Healthcare Sector

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ABSTRACT

Essentially, the purpose of investment in information systems and information technology (IS/IT) is to improve the operational efficiency of the organizations, reducing costs and improving levels of quality. Thus, many traditional appraisal techniques are used to evaluate tangible benefits, which are based on direct project costs. Since the 1980s, IS/IT has positioned itself as a strategic tool that through flexibility and innovative ways can produce superior performance. The health sector has sought to improve its effectiveness and efficiency by adopting IS/IT solutions to increase the quality of services, namely patient safety, organizational efficiency, and end-user satisfaction. Hospitals are complex organizations, and this complexity magnifies the opportunity for inevitable human errors. A poorly integrated system can decrease operational efficiency and reduce the quality of healthcare services. The issue remains controversial, as evidenced by several articles. The authors noticed that emergent technologies may offer opportunities to those who can exploit them effectively.

KEYWORDS

IS/IT Implementations in Healthcare, IS/IT in Healthcare, IS/IT Investments in Healthcare, IS/IT Projects in Healthcare, Success of IS/IT in Healthcare

INTRODUCTION

The business value of Information Systems and Information Technology (IS/IT) investments is predicted to remain, one of the major topics for the researchers (Dehning et al., 2014; Roztocki & Weistroffer, 2008). Some early studies (Dos Santos et al., 1993; Hitt & Brinjolfsson, 1996; Im et al., 2001; Rai et al., 1997; West & Courtney, 1993) doubt from the economic value of IS/IT, the vast majority of authors find empirical evidence and theoretical arguments in favor of both the operational and strategic relevance of IS/IT (Aral et al., 2007; Beccalli, 2007; Dedrick et al., 2003; Dehning et al., 2003; Han et al., 2011; Kim et al., 2009; Kohli & Grover, 2008; Lee et al., 2011; Lin et al., 2006; Mahmood & Mann, 2005; Neirotti & Paolucci, 2007; Peslak, 2003; Ramirez et al., 2010; Santhanam & Hartono, 2003; Shin, 2006; Swierczek & Shrestha, 2003; Zhang, 2005). As competition increases because of globalization and other market factors, it is even more important that an organization performs at its best capabilities. Organizations are being put under increasing pressure to justify the large amount of financial resources spent on IS/IT assets (Gomes et al., 2013). The decision-making process over IS/IT investments is not

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as objective and transparent as it is claimed to be, creating significant failures on achievement of the objectives and their related benefits (Berghout et al., 2005). Organizations seek benefits and value only in monetary terms, which have resulted in a lot of wasted energy, time and money. It is very common that organizations place their focus on the technical aspects such as does it work? rather than the social aspects such as is this adopted successfully? or from a business perspective is this delivering value? (Gomes & Romão, 2017). The health care sector has a unique, complex, dynamic context which differ significantly from other industries in which IS/IT have been applied (Chau & Hu, 2002; Westbrook et al., 2004). IS/IT for healthcare have been referred as a key instrument that facilitate communication, processing and transmission of information by electronic means, with the aim of improving human health (Bukachi & Pakenham-Walsh, 2007; Drury, 2005; Häyrinen et al., 2008). The difficulties due to the implementation of IS/IT solutions and assessment of their performance have been acknowledged by several scholars (Lueg & Lu, 2012, 2013). Therefore, finding means to overcome these issues and to improve the performance and return from investments in IS/IT has been a research focus of the last decades. Grounded by theory of competitive strategy, several authors argued that IS/IT can contribute to more profits if it cannot be replicated easily or it can make product differentiation (Mithas et al., 2012). Although many studies have focused on the consequences of IS/IT investments, fewer studies have examined factors that impact the IS/IT capabilities (Devaraj & Kohli, 2003; Brynjolfsson, 1993). IS/IT investments are now spread worldwide, adopted and used in many sectors, including the health sector. While promoting population health has been the classic goal of public health practice and policy (Dawson & Verweij, 2007), in recent decades, new objectives in terms of autonomy and equality have been introduced (Munthe, 2008). According to the World Health Organization, the use of IS/IT in health is not merely about technology but is a means to reach a series of desired outcomes across the entire health system (WHO, 2005). As stated by the European Community, the aim of IS/IT for Health is to improve significantly the quality, access and efficacy of healthcare for all citizens (EC, 2006). The move toward computer information systems began from the 1970s that ultimate goal of these systems is access to Electronic Health Record (EHR) (Shortliffe & Barnett, 2014). EHR implementation results in the improved quality of care, cost effectiveness, customer-orientation and timely access to complete and precise information (Gagnon et al., 2014). Despite the potential benefits of EHR, its implementation is a difficult and complex task whose success and productivity depends on many factors (Yusof et al., 2008; Terry et al., 2008).

METHODOLOGY

This study is aimed to research the pattern of IS/IT projects in healthcare, using articles published in academic health management journals. Two stages were performed to achieve this objective. Firstly, the selection of academic documentation, and secondly the content analysis. The first step was performed through the collection of manuscripts based on a literature review using the article keywords in several academic databases. The titles, abstracts, keywords, and texts of these journals were searched based on the following the terms; IS/IT in Healthcare, Success of IS/IT in Healthcare, IS/IT Projects in Healthcare IS/IT investments in Healthcare, IS/IT Implementations in Healthcare. The goal was to identify as many applications of the IS/IT in the health sector. The second phase were the selection of documents that meet the study goals by comparing the documents retrieved with the objectives of our study.

LITERATURE REVIEW

IS/IT Implementations

According to several studies, there is a growing use of information and communication technologies by citizens and their families regarding the search for health information (Andreassen et al., 2007).

Since the 1990´s, the health sector has sought to improve its effectiveness and efficiency by adopting IS/IT to increase the levels of services quality, namely, patient safety, organizational efficiency and patient satisfaction (Bates & Gawande, 2002; Pan et al., 2005; Raghupathi & Tan, 1999). IS/IT in healthcare represents the integrated effort to collect, process, report and use health information and knowledge to influence policy-making, program action and research and further states that they are essential to the effective functioning of health systems worldwide (WHO, 2006). The broader meaning of this system refers to any system that captures, stores, manages or transmits information related to the health of individuals or the activities of organizations that work within the health sector (Bukachi & Pakenham-Walsh, 2007; Mäenpää et al., 2009; Low & Chen, 2012). The use of IS/IT in health provides an important support for specialized services, and increases the efficiency, quality, safety and also reduces medical errors (Low & Chen, 2012). Hospitals are complex organizations and this complexity magnifies the opportunity for inevitable human errors (Weick & Sutcliffe, 2001). A poorly integrated IS/IT can increase the frequency of medical errors, decrease operational efficiency, and reduce the quality of healthcare services (Themistocleous et al., 2009). Despite remarkable technical progress, failures have still been reported when integrating technically sound systems into processes of care (Lorenzi & Riley, 2003). We live in times where healthcare providers generate significant amounts of personal data about patients and the major obstacle to the management of this increasing volume of information is the difficulty, or inability, of sharing information across systems and between organizations (Grimson et al., 2000). The greatest evolution in the role of information in the health system, namely on the doctor-patient relationship, is related to the enormous flow of medical or health information that is present on the Internet (Katz & Rice, 2002); Netlleton et al., 2011; Murray et al., 2003). In this new reality patients play a more active role in their own healthcare (Collste, 2002). Medical information needed for clinical decision making has increased significantly, however the accessibility of health data is still poor, resulting in inappropriate decisions and sometimes in medical errors (Tierney, 2001). The IS/IT tools have been developed to increase the accessibility and management of medical information with the aim of supporting medical decision, of increasing the coordination between different healthcare providers, and of promoting the use of guidelines, thereby improving the global quality of care (Demiris & Kneale, 2015). However, in addition to providing new capabilities, new technologies also impact the technical, social, organizational, economic, cultural, and political dimensions of work in new and different ways (Anderson & Aydin, 1994). IS/IT processes have the potential to significantly reduce the rate of these medical errors by providing relevant information in real time to all who need it (Bates et al., 2001; Chaudhry et al., 2006). An important challenge for the future is to seek for a real clinical integration of systems. Clinical integration between providers and hospitals has historically been a goal which is continually sought, but rarely achieved. It will become crucial that the design of future applications be integrated easier into existing systems, through open communication interface (Geissbuhler et al., 2001). There is a growing consensus that organizational factors are far more critical for the successful implementation of IS/IT, than technical considerations (Gomes & Romão, 2016; Markus, 2000). Achieving successful change is much easier if all stakeholders are committed, and the earlier this commitment is achieved, the smoother is the path to a successful outcome (Bradley, 2006).

The use of IS/IT is recognized as being a major factor for the promotion of clinical practices and supportive care (Anderson, 1997; Kumar & Preetha, 2012) and it is usually widespread in any modern hospital as a key instrument in healthcare delivery and in public healthcare (Drury, 2005; Lymberis & Dittmar, 2007). The globally accepted assumption is that IS/IT can, and does have a positive effect on healthcare, although the evidence supporting its practical use is low (Wootton, 2009). In fact, many decisions on the implementation of the IS/IT in healthcare are made with little or no information about the impact and consequences of its use (Kazanjian & Green, 2002). Information systems are used extensively in healthcare organizations to support various conventional data processing tasks. Range from simple systems, such as transaction processing systems, to complex systems, such as clinical decision support systems (Gomes, 2018).

IS/IT Project Failures

We have been witnessing an increased boom in IS/IT healthcare investments and this phenomenon has expanded dramatically over last 10 years. The total investments for each large hospital are huge, yet the overall benefits and costs of hospital information systems have rarely been assessed (Byrne et al., 2010). When systems are evaluated, about 75% are considered to have failed (Heeks, 2002) and there is no evidence that they improve the productivity of health professionals (Smith et al., 2009). Along with the computerization of healthcare sector (Brailer & Terasawa, 2003; Dick et al., 1997; Yasnoff et al., 2004; Barrett et al., 2003) systems failures have also been reported (Southon et al., 1999; Goddard, 2000; Poon et al., 2004) showing the enormous spending of money and loss of confidence in IS/IT from the side of users and managers.

The investments on IS/IT for healthcare are financially relevant and still growing worldwide. While the potential and benefits from the use of technological innovation in health are large, the risks are also substantial. Therefore, it seems wise that the organizations should give more attention to adopting formal project evaluations and benefits management methodologies to ensure that the expected benefits from investments are eventually realized (Dibb, 2001; Ward at el., 1996; Heeks & Davies,1999).

The results of the implementation of IS/IT projects in healthcare have revealed a waste of financial resources in acquiring large sized systems, which are totally ineffective. There is a widespread feeling that a significant proportion of initiatives in IS/IT healthcare have failed. Studies have identified high failure rates in IS/IT projects in various sectors, particularly in hospitals (Heeks & Davies, 1999; Kaplan & Harris-Salamone, 2009; Sumner, 1999; Wears & Berg, 2005). A study by Gheorghiu (Gheorghiu, 2006) found that 70% to 80% of all IS/IT implementations fail. Heeks (Heeks, 2008) states that 35% of IS/IT projects are total failures and 50% partial failures, with only 15% being considered successful. Similarly, Kaplan and Harris-Salamone (Kaplan & Harris-Salamone, 2009) confirmed a value greater than 30% for the failure rates of major health information technology projects.

Why do IS/IT systems implementations fail in health organizations? Healthcare projects are a complex undertaking, which depends largely on the quality of existing information (Bose, 2003). Organizations need to have three types of skills to produce successful projects (Lorenzi & Riley, 2003): (a) Technical skills - which include a broad range of skills, such as the technical knowledge, experience, and abilities; (b) Project management skills - which include the knowledge, techniques, and skills necessary to manage successfully the IS/IT projects; (c) People and organizational skills - which include the wide range of skills necessary to effectively interface with all of the IS/IT stakeholders.

Several reasons are pointed out to project failures in healthcare, namely: (a) Lack of senior management commitment being incomplete or missing altogether (Bukachi & Pakenham-Walsh, 2007); (b) Difficulties in the engagement of health professionals, and a lack of focus on end-users (Elder & Clarke, 2007); (c) Incorrect specification requirements(Lucas, 2008; Gauld, 2007); (d) An absent or inadequate process of change (Yeo, 2002); (e) Poor knowledge of the complexity of health systems(Al-Ahmad et al., 2009); (f) Missing investments in human resources (Elder & Clarke, 2007; Bukachi & Pakenham-Walsh, 2007).

In various aspects, IS/IT implementations in healthcare are different from other projects from other industries. The key main differences were related to the environment, the diversity of systems and the devices that need to work, together with the challenge of integration and interoperability which is required to meet the expectations of different stakeholder groups regarding that which constitutes project success (Abouzhara, 2011).

The Success of IS/IT Healthcare Projects

IS/IT implementations are part of the continuous improvement cycle of healthcare quality and are based on several key success factors: Reliable information, engagement of all stakeholders in all phases of the work improvement and a proper infrastructure involving multidisciplinary teams (Brandrud et al., 2011).

Success in the strategic use of IS/IT project success in healthcare relies on the integration of all systems, such as patient records, clinical decision support, transaction processing, digital imaging, and information reporting (Jensen, 2013). When diverse information systems are interoperable on a standardized platform, all stakeholders can streamline the implementation process, and improve the system quality (Grossmann et al., 2014). IS/IT project success also refers to user satisfaction, system use, perceived usefulness and system quality (Sabherwal et al., 2006).

The difficulties of implementing IS/IT projects in health, as well as the evaluation of their performance, have been the target of several researches in the last decades (Gomes, 2018; Lueg & Lu, 2012; Santos et., 2014; Kaplan & Harris-Salamone, 2009). Most of these researches focus on identifying critical factors or best practices that allow organizations to successfully complete their projects (Santos et al., 2014; Hung et al., 2014; Ghazvini & Shukur, 2013). A comprehensive literature review on large-scale IS/IT projects executed in ten different countries identified eighteen frequently cited critical success factors (CSFs) for inter-enterprise systems implementations (Koumaditis et al., 2013). Five of them are the same as identified by the above-mentioned healthcare IS/IT implementations, namely: (a) Top management support; (b) Information systems adjustments; (c) Business process adjustments; (d) Organizational resistance; (e) Capability of key team members. Top management support has been argued to be the most critical factor for IS/IT project success (Nagi et al., 2008; Iacovou & Nakatsu, 2008). Extant research largely focuses on the consequences of management support for IS/ IT projects (Liu et al., 2010; Dong et al., 2009; Liang et al., 2007).

Must has been written regarding the development of IS/IT initiatives in healthcare sector. The publications emphasized two main aspects: The slowness of adoption of these initiatives and the resistance to change (Lorenzi & Riley, 2003; Sharma & Yetton, 2003; Leonard, 2000, 2004). These authors highlighted a set of reasons why physicians failed on IS/IT acceptance, namely: (a) On an adequate base support; (b) Absence of user-friendly interfaces; (c) Difficulties on the information collection process; (d) In adequate training plan; (e) Lack of leadership in IS/IT that was respected by physicians; (f) Organization control default over the clinical practices.

The IS/IT interventions are perceived as an interference in the traditional physician role. The resistance is higher when the IS/IT interventions does not generate additional value for physicians' practices (Leonard & Winkelman, 2002). There are also reported innovative approaches concerning the improvement of the IS/IT in healthcare adoption (Burke, 2002; Cranfield et al., 2015; Cresswell et al., 2013). The research effort developed the academy focused mainly on the identification of the elements with the hope those will effective ensure the IS/IT implementations, mainly in: (a) Identifying information insufficiencies and difficulties that are healthcare exclusively; (b) Identifying areas where the IS/IT implementations can make most difference; (c) Building systems that support shared objectives; (d) Designing and developing scalable tools, provider-patient interfaces and Internet applications; (e) Investing in existing resources.

Since success can be judged in many dimensions, such as; effectiveness, efficiency, organizational attitudes and commitment, employee satisfaction, and patient satisfaction, existing CSF lists could be problematic, making the situation very complex and offer a more simplified solution than what is needed in practice (Berg, 2001). Leonard (2004) identifies a set of CSFs for new technological adoption, such as: (a) Resistance to change; (b) Industry experience in using technology; (c) Training before and during the transition; (e) Buy-in or contribution from stakeholder groups; (f) Level of effective reporting on outcome measures during and after implementation; (g) Level of effectiveness in dealing with the implementation.

According to Medlin et al. (2014) the implementation of success cost-effective interventions in healthcare are mainly due: (a) A strong leadership; (b) Affective management; (c) Realistic financing; (d) A constantly improvements on strategy; (e) Processes by incorporating new research findings and technical innovation. Robinson (2007) highlighted factors such as: (a) The appropriate leadership; (b) Good communication; (c) Detailed roadmap of implementation; (d) Setting measurable goals; (e) Specific attention to the preparation of human resources in terms of motivation and training. Tempfer

and Nowak (2011) addressed the organizational development in healthcare and identified the following success factors: (a) Adequate financing; (b) Partnerships; (c) Advanced project logistics; (d) Small scale projects; (e) Adequate internal and external communication.

Reyes-Alcázar et al. (2012) noted the CSFs that need to be considered for the health sector are the following: (a) A patient-centered approach: needs and expectations of end-users (Mead & Bower, 2000); (b) Leadership: the importance on improving the quality of healthcare (West et al., 2004); (c) Team work: a multidisciplinary process focused on a healthcare team that shares common goals (Mickan, 2005); (d) Autonomy and responsibility: greater autonomy among health professionals (Harrison & Dowswell, 2002); (e) An integrated view of healthcare; the quality of patient care as perceived by end-users is a key element (Torres-Olivera, 2003); (f) Professional skills: promoting skills encourages professional development (Reyes-Alcázar et al., 2012); (g) Results focused: the measurement and evaluation of clinical performance, hospital management and end-user satisfaction; (h) Internal and external audits: continuous quality improvement cicle (Patton, 2008; Hyrkäs & Lehti, 2003; Le Brasseur et al., 2002).

CSFs have been criticized as offering over-simplified solutions that are difficult to realize in practice, since many contextual circumstances also influence the outcome (Berg, M. (2001; Wagner et al., 2006).

CONCLUSION

The ongoing health developments are driven mainly by demographic changes, which include increasing population aging, chronic diseases, cultural changes, advances in science and technology, widespread access to digital networks, and awareness of the need to improve quality and safety in the provision of health care. Today's technology plays a significant role, permitting the storage and rapid retrieval of patient records and other important information. At the same time, patients expect that their sensitive personal information to be handled appropriately, to ensure accuracy and confidentiality. Healthcare organizations become more and more challenged on how to assure a fair return from investments in IS/IT.

IS/IT has been referred to, as a key instrument in healthcare delivery and public health. IS/IT have great potential to improve healthcare by enhancing access to health information and making health services more efficient. They can also contribute to improving the quality of services and reducing their cost. A patient-centered information system can track individual health problems and treatment over time, giving insights about optimal diagnosis and treatment of the individual, as well as improving the delivery of services. The main goal of IS/IT is to manage information from all healthcare-related activities, including planning, monitoring, coordination, and decision making. The real-time access, exchange and receipt of clinical data provided by the system have improved clinical documentation, reduced the duplication of care services, and supported better decision making related to patient care. IS/IT are designed to support clinicians in accessing and working with a variety of patient information and promoting healthcare quality information sharing. Proper training is a major determinant for success in the adoption of IS/IT by health professionals, and it has a great influence on the integration of technologies in clinical practice. Authors identify organizational culture as exerting a positive influence on the development of superior project management practices. Critical success factors are specific elements of the organization of the internal and external environment, which is necessary to ensure goal attainment and the success of a project. As previously mentioned, the IS/IT investments in healthcare brings many benefits to day-by-day of the organizations. As also previously referred, these implementations have a large impact on all areas of the health organizations, professional staff, managers, politicians and public. Some of the following incidents remain current and actions are required for their minimization and resolution. These profound changes implicate important ethical challenges. Observations of IS/IT implementations have shown that a change in

technology alters roles, strategies, and paths to failure, highlighting that the recognition of these new trends recommends the examination of the new technologies for avoiding threats to safety and redesigning them to prevent undesirable accidents. The study of the success or failure of these initiatives has become vitally important for the performance of these organizations.

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