Hospital Information Systems Planning: Strategic IT Alignment in Healthcare

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Abstract: Despite the fact that Information Systems (IS) in hospitals increase the organizational value and performance, several Information Technology (IT) investments fail, due to the lack of strategic development. A strategic plan should include the strategy of health care organization or strategic aims, the resulting information management strategies, the existing state of Hospital Information Systems (HIS) and an evaluation on how far the existing IS align. Previous researches have examined HIS frameworks for planning and success, and HIS success factors, but they do not provide an integration of strategic planning with the HIS development. The purpose of this paper is to present a state of the art of the knowledge about strategic planning and success of HIS with a focus on the challenges in developing HIS. The findings show that there are a number of important issues that lead to inefficiencies in the current implementation practice.

Keywords: **Hospital Information Systems, Business Strategy, Planning, Success, Alignment**

Introduction

Hospital managers have recognized the significance of using Information Technology (IT) as a strategic tool. Similarly, they have realized that technological innovations can have an impact on hospital performance and IT can lead to better cost control and service quality (do Carmo Caccia-Bava et al. 2006). Outputs related to the adoption of HIS are associated with superior productivity levels among nurses, optimum integrated care processes and better patient safety and quality of care, to name but a few (Ahmadi et al. 2015). Nevertheless, managers also have noticed that technology is no panacea. Technological innovation is successful when hospitals make considerable preparation. At several health care organizations technological investments are viewed more as a necessary undesired change than as a strategic necessity (do Carmo Caccia-Bava et al. 2006).

Researchers focus on improving organizational performance through the adoption of HIS, regarding quality of care and financial viability. In this view researchers address that both organizational and technical barriers in different stages of the adoption process across different stakeholder levels of activity influence the use of IT and, as a consequence, the organizational objectives and performance. According to these findings, stakeholders at different levels of the organization make significant strategic decisions about how to act to the current complex external environment and how to involve different workplace innovations. Therefore, the significant question is how does HIS support the

organization achieve long-term strategic objectives? Managers invest on IT in hospitals in order to improve patient care as well as hospital's objectives. The development of HIS should be aligned with the overall strategy in order to make easier decision making by executives (Avgar et al. 2012).

Despite the fact that previous researchers have examined the HIS success factors when it comes to frameworks of planning, they have merely focused on evaluation methods without providing an integration of strategic planning on HIS development. Thus, the purpose of this study is to present a state of the art of the knowledge about strategic planning and success of HIS which focuses on the challenges in developing HIS.

The contribution of this study is twofold. First, researchers who would like to systematically study the area of HIS and business strategy can get an overview by studying this literature review. Secondly, there is also a practical contribution. By analyzing and synthesizing the success factors and strategic methods of HIS planning, health project managers and decision makers will be able to select and develop a less costly Information System. Furthermore, IS executives can develop HIS based on strategic frameworks for IS planning, so they can align the IT strategy with the business strategy in order to achieve both organization's and system's goals.

The paper has been structured as follows: The next section describes the literature review methodology which was followed in order to search and analyze the relative articles. Then, the findings of this review are discussed in next sections. Finally, conclusion and suggestions for future research conclude the paper.

Literature Review

Literature review searching

Studies were spotted using a three phased literature review methodology which was suggested by Webster and Watson (2002) in order to achieve the aim of the paper. First, a search of the extant literature reviews was done to select the databases and keywords of the basic search. Then, the searching was done in the selected databases using keywords related to HIS and strategy. Next, the backward search was implemented to examine the references of the selected papers and finally the forward search to examine the citations of the selected papers in order to increase their amount. After the selection of the papers, they were classified according to their content.

The search was done in Medline, Scopus, Science Direct, Web of Science and ABI/INFORM using the following keywords "Health Information Systems and Strategy" and "Hospital Information Systems and Strategy".

Papers published in academic journals and proceedings of conferences were selected without limiting them in a specific period. The admitted papers belonged

to fields of Strategy, Management, Computer Science and Medicine. Finally, published papers were only in English.

Overall, 403 articles were gathered using keywords in all databases. Then, scanning their titles, 106 articles were found to be relevant to the aim of this paper. Next, examining their abstract, 59 were accepted. A number of studies were rejected because their full text was not accessible. 45 articles were examined according to their full text. Duplicate articles were deleted and 23 articles were identified (Fig 1).
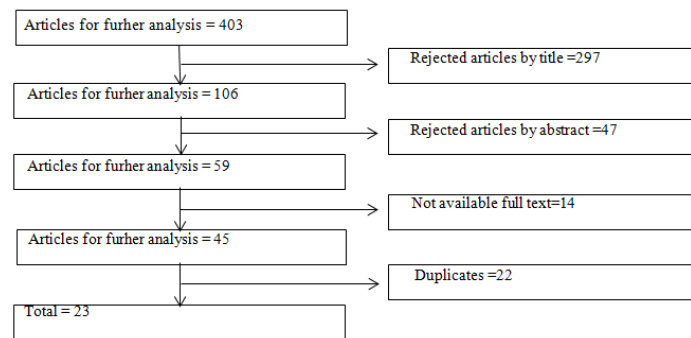

Fig 1. Article Selection Process

In these 23 articles, 10 were added by the backward search. Additionally, 4 more articles were added by the forward search and so a total of 37 articles were studied. According to the purpose of this paper, authors analyzed only papers which studied HIS frameworks for planning.

Hospital Information Systems Planning

Strategic information management concerns the health care organization's information processing as a whole. It is influenced by the organization's business strategy and strategic objectives and has to align them with information strategy. The outcome of strategic information management planning process is the development of a strategic information management plan. The plan involves the direction and strategy of information management and provides directives for the development and use of HIS by presenting its intended architecture. It analyzes the way in which information management will be organized, the divergent work groups have to do and the ways the various stakeholders are concerned. The strategic plan provides direction and schedule for each tactical and operational information management function in the health care organization (Winter et al. 2001).

A Strategic Information Management plan provides general guidelines for developing HIS. HIS could be described as the socio-technical subsystems of a

health care organization, which includes all information processing activities as well as the associated human or technical resources in their respective information processing role. It maintains future strategic information management planning activities by determining the goals of strategic information management fulfilled with hospital goals, describing the complete existing state of hospital information processing involving paper based and computer-based information processing tools, evaluating the existing state and recognizing deficits, defining the required call for action and determining the future state and identifying a migration strategy which defines the tactical projects to be implemented (Brigl et al. 2005).

Table 1 summarizes the different phases and stages which have been suggested by researchers so that managers can strategically plan the development of HIS.

Table 1. Phases and Stages for Strategic Planning of HIS

HIS Phases	Stages	References
Planning and Analysis phase	problem identification, the problem analysis, the IT/IS solution requirements and the IT/IS solution decision	Snyder-Halpern (2001); Winter et al. (2001)
Design phase	design specification, the component development, the component bench testing and the solution integration	
Implementation and Maintenance phase	solution field testing, the solution adoption, the routine use in practice and the adoption consequences	
Establishing the need for change	identification of the need for the implementation of HIS, involvement of employees, analysis of the requirements and business's needs	Cresswell et al. (2013)
Selecting a system	determination of individual users' needs, difficulties and demands, cost analysis	
Planning (implementation strategy, infrastructure, training)	formulation of IT strategy, implementation of the HIS	
Maintenance and evaluation	assessment of the system, evaluation of the achieved goals	
Analysis	Feasibility of development of HIS, Determining hardware properties of HIS, Determining software properties of HIS, Identifying problems of the previous	Rahimi et al. (2014)

	information system, Defining IT strategy
Design	Determining data elements (informational needs) of HIS, Purchasing and selecting HIS system, Determining educational needs to development of HIS
Implementation	Participating in educational courses to development of HIS, Experimental implementation of HIS system, Determining the capability of using and the rate of being useful HIS
Evaluation	Evaluating the performance of HIS system, Determining errors and problems of HIS system, Proposing the necessary modifications in HIS system, Monitoring and updating HIS

Human, organizational and technical resources must be integrated in order to achieve successful HIS development. The alignment of organizational with technical dimensions as well as alignment with work routines, management assumptions, patient care philosophies and users' needs influences different aspects of HIS integration in complex ways. Poor alignment between system developers' objectives and health managers' cultural values conduces to user reluctance to use Clinical Decision Support Systems (Yusof et al. 2008).

Conclusions

One of the main challenges in health IT development on the strategic level is the integration with other organizational innovations. As indicated above, regarding the introduction of HIS, hospitals aim to increase quality and efficiency by implementing innovative care delivery practices and organizational arrangements (Avgar et al. 2012).

The alignment between business and IT has become one of the top management concerns in businesses for over two decades. The practical aspect of alignment is still a challenge to several implementers due to the impact of external forces, such as cost and IT transformation. Managers in hospitals should try to improve their business functions during the change of business strategies in order to achieve strategic alignment of HIS. Moreover, health managers should ensure that during the business processes change, HIS development will be updated to meet the new changes. This supports the improvement of overall HIS strategy in health facilities (Odiit et al. 2014).

A limitation of the study stems from the fact that papers were strictly published in English and were included in journals and conference proceedings although,

papers which focused on business management perspective of HIS planning were included. Thus, the technical aspects of this field were ignored. Future researchers could study these papers and examine further the IS planning frameworks presented in this study, using practical evidence. Scholars need to provide additional empirical evidence on the impact of organizational factors in HIS adoption and success (Avgar et al. 2012). Moreover, future researchers could combine the models of change management in the HIS development in order to highlight the advantages and the challenges of these investments.

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