

# Multi-Dimensional Modeling in the Health Industry

**Markus Belkin**

*RMIT University, Australia*

**Brian Corbitt**

*RMIT University, Australia*

**Konrad Peszynski**

*RMIT University, Australia*

## INTRODUCTION

Today's information-rich and knowledge-based business society relies heavily on information technology (IT) and information systems (IS) design to enable the business to operate effectively and create a competitive advantage. Firms must align their IS design and performance with the core business competencies and business goals of the firm. There are multiple paths toward this end, and inefficiencies and conflicts may arise when the firm's IS strategies diverge from the business goals. There is no difference in the health industry, where conflicts exist between IS infrastructure and development, and business goals. The existence of inflexible mainframe IS unable to support modern technology such as the Internet, telemedicine, wireless technology, and real-time management software has compromised the business goals and business development in the health vertical to the extent that it has now fallen behind other comparable knowledge industries.

Where reference is made to more cohesiveness among IS capability, independence of the IS department, and the alignment of business goals, there is no mechanism or detail given on how this is achieved. Grover and Segars (2005) claim that while there have been studies that examine the "what" questions in strategic information system planning (SISP), particularly concerning the issue of IS business alignment, there has been little on the "how" questions.

A multidimensional cohesive model for IS planning and measurement of IS effectiveness has been developed as a means to more integrated planning and a simpler but more realistic means of assessing the effectiveness of the IS in business. The multidimensional cohesive model is applied to the selection and implementation of an information system in the health industry. The

implications this has on the health industry include the opportunity to change to a more efficient business structure, a means to implement a modern technology- (Web-) based IS and an inherent capacity for change management.

## BACKGROUND

Strategic information system planning (SISP) has evolved in method and style over the last decade on the basis that it is important because it emphasizes the need to bring information technology (IT) to align with and sometimes influence the strategic direction of the firm (Grover & Segars, 2005). In rich IT environments, this has a recognized relevance to competitiveness. However, although much has been studied with respect to business and IT alignment, little research has been undertaken into the mechanisms of SISP, including process planning.

Grover and Segars (2005) examined the evolution and maturing of SISP from the early 1970s and made several important observations. These were later supported by other researchers such as Earl (1993) and Sabherwal and King (1995). They found that many studies focused on planning content, with particular interest in methods and measurement of alignment between business and IS strategy (Burn & Szeto, 2000; King, 1998). They observed that these studies did little to illuminate the organizational aspects of planning.

Early studies by Pyburn (1983), in an attempt to identify institutionalized planning dimensions, actions, and behaviors, made field observations that noted the existence of both a *rational/structured* process and a *personal-informal* process. Earl (1993) made similar observations when he distinguished SISP approaches

based on the degree of rationality and adaptability built into the planning process. Earl (1993), however, noted a hybrid organizational system of planning that seemed to be more effective than the highly structured and less adaptable rational approaches. This observation was ratified by the work of Sabherwal and King (1995).

More recent studies by Segars (1997) and Segars and Grover (1998) described and measured planning process dimensions and found that hybrid systems tended to be more successful and seemed to apply generally to a variety of industries. Through their research, Grover and Segars (2005) identified six important process dimensions of SISP: comprehensiveness, formalization, focus, flow, participation, and consistency. These dimensions are robust in describing the SISP design and extend beyond the methodological-based and less-generalizable descriptions of planning.

Wang and Tai (2003) add to the dimensions for success in SISP with their work on organizational contexts, commenting that most process-oriented research has recommended using integration and implementation mechanisms while not considering the possible contingent effect of contextual factors. They suggest that this may lead to the planning system being less adaptable to various organizational contexts and therefore be overly deterministic.

Wang and Tai (2003) acknowledge that although their work is generally supported by empirical data, a theory of IS planning is currently lacking. Their results did, however, support the contention that IS planning is a rational-adaptive process, supporting the claims of Earl (1993) and Grover and Segars (2005).

The link between strategic performance and planning has been found to be inconsistent by Grover and Segars (2005) and Premkumar and King (1992). Some indicators suggested for assessment of IS effectiveness have been IS usage, user information satisfaction (UIS), quality of decision-making, productivity from cost/benefit analysis, and system quality (Ein-Dor and Segev, 1978). The most commonly favored factors have been IS use and UIS. However, because of a lack of a theoretical framework for placing UIS within the greater context of overall IS effectiveness, its relevance as a performance measurement has been questioned (Grover & Segars, 2005).

Grover and Segars (2005) argue that successful SISP should achieve alignment between IS and business strategy; analyze and understand the business and associated technologies, foster cooperation and

partnership between managers and user groups, anticipate relevant events/issues within the competitive environment, and adapt to unexpected organizational and environmental change. This multidimensional conceptualization approach is supported by Delone and McLean (1992).

However, further research is needed in order to define the construct space for effectiveness criteria. Delone and McLean (1992, 2003) have initiated research to this end with their IS Success model. Their model consists of six interdependent constructs, including system quality, information quality, use, user satisfaction, individual impact, and organizational impact (Delone & McLean, 1998). The measure of overall success should combine individual measures from these constructs to create a comprehensive scheme for performance.

Grover and Segars (2005) have developed a theoretically based construct space for IS effectiveness that complements the IS Success of Delone and McLean (1992). Their construct model provides a means of cross-validating the IS Success model and introduces a relative standard used for assessing performance.

To build a complete picture of IS effectiveness, evaluation must be conducted from both a macro (organizational) and micro (individual) view. Such evaluation is necessary because IS supports individual as well as organizational decision-making and can also provide competitive advantage.

From the organizational effectiveness literature, Brewer (1983) argues that there are three types of evaluation: process, response, and impact. Process evaluation involves the assumption that organizational members work to ensure efficient use of resources when resources are limited. This assessment is based on user dependence on IS, user perceptions of system ownership, and the extent to which IS is disseminated throughout organizational administration and operating procedure.

Response evaluation assesses the individual or the organization to the IS service or product. This assessment has significance in respect to user resistance to innovation and implementation. Any resistance or habituation must be identified to ensure successful implementation. This assessment also considers complex variables such as user's beliefs and attitudes toward IS in general, which are important for fulfillment of IS planning (Grover & Segars, 2005).

Impact evaluation represents the most comprehensive and most difficult to assess evaluation. It is

5 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/multidimensional-modeling-health-industry/13032](http://www.igi-global.com/chapter/multidimensional-modeling-health-industry/13032)

## Related Content

---

### An Efficient and Lossless Cryptosystem for Security in Tele-Ophthalmology Applications Using Chaotic Theory

Garima Mehta, Malay Kishore Dutta and Pyung Soo Kim (2016). *International Journal of E-Health and Medical Communications* (pp. 28-47).

[www.irma-international.org/article/an-efficient-and-lossless-cryptosystem-for-security-in-tele-ophthalmology-applications-using-chaotic-theory/167844](http://www.irma-international.org/article/an-efficient-and-lossless-cryptosystem-for-security-in-tele-ophthalmology-applications-using-chaotic-theory/167844)

### The European Perspective of E-Health and a Framework for its Economic Evaluation

Paola Di Giacomo (2011). *E-Health Systems Quality and Reliability: Models and Standards* (pp. 28-36).

[www.irma-international.org/chapter/european-perspective-health-framework-its/45609](http://www.irma-international.org/chapter/european-perspective-health-framework-its/45609)

### The Patient is Dead: Continuing Medical Education and the Hidden Curriculum

Shaifali Bansal (2012). *International Journal of User-Driven Healthcare* (pp. 70-75).

[www.irma-international.org/article/patient-dead-continuing-medical-education/64332](http://www.irma-international.org/article/patient-dead-continuing-medical-education/64332)

### Personal Health Records Systems Go Mobile: Defining Evaluation Components

Phillip Olla and Joseph Tan (2010). *Health Information Systems: Concepts, Methodologies, Tools, and Applications* (pp. 750-772).

[www.irma-international.org/chapter/personal-health-records-systems-mobile/49897](http://www.irma-international.org/chapter/personal-health-records-systems-mobile/49897)

### Technology Acceptance and Care Self-Management: Consideration in Context of Chronic Care Management

Patcharin Wannatawee, Muna Alhammad and Stephen R. Gulliver (2014). *Handbook of Research on Patient Safety and Quality Care through Health Informatics* (pp. 295-313).

[www.irma-international.org/chapter/technology-acceptance-and-care-self-management/104087](http://www.irma-international.org/chapter/technology-acceptance-and-care-self-management/104087)