SAIS 2005 Proceedings   Southern (SAIS)

3-1-2005

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An Integrative Health Information Systems Approach For Facilitating Strategic Planning In Hospitals

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Abstract

This paper explores the need for integrating effective information systems management into hospital strategic planning and suggests a methodology for constructing a strategic information system (SIS) development framework that is flexible enough to permit a hospital to adjust its strategies to environmental changes and to stay on course with its vision. This SIS architecture utilizes a systems perspective of strategic decision making within a hospital in two phases. Organizational analysis examines the hospital's current position within the environment and the development of the hospital's vision and goals. Strategic Information Systems development includes SIS goals assessment, strategic information requirements analysis (SIRA) and SIS implementation planning.

Keywords: strategic planning, health care, information systems, strategic information systems (SIS)

Introduction

The need to include effective information management in strategic planning is recognized by hospital management as a crucial survival factor. To manage the information needed to help establish strategies, increasing numbers of hospitals are looking toward harnessing strategic information systems (SIS) as a competitive weapon. SIS are playing a larger role in organizations' approaches to obtaining competitive advantage (Rackoff, et. al, 1985, Kim, et al 1990, Gordon, et al, 1998). Recent changes in information system technology, including increased connectivity, integrated systems, geographic information systems, and expert system shells, have created new avenues for SIS development in hospitals. Uncertainty created by environmental changes has caused hospital administrators to recognize the need to integrate external data with current internal operations and decision making processes (Cerne, 1988, Iacovou, 2004). Historically, hospitals have viewed operations as two primarily separate functions: medical functions and business functions (Shaffert and McDowell, 1978). However, many medical functions overlap with business functions and need data generated by each other's processes. Strategic planning addresses individual functional aspects while requiring a holistic perspective which synergistically integrates all functional area concerns in a systematic fashion. The objective of this research is to construct a SIS development framework flexible enough to permit a hospital to adjust its strategies and its SIS development plan to environmental changes to stay on course with its vision.

Hospital SIS Development Frameworks

Previous SIS development frameworks take a functional view of a hospital's operations with business and medical functions acting as separate entities. In addition, there was a limited amount of formal data flow between the hospital and its constituents (e.g., consumers, government, suppliers, society). Shaffert and McDowell (1978) propose a framework for hospital information systems which regards a hospital as consisting of two major functions: medical and business requiring

four types of information (strategic planning, operational planning, control reporting, and transaction systems). Three major characteristics of their framework warrant further discussion and possible modification. First, their framework considers strategic planning to be a functional process. Second, it considers integration of hospital subsystems to be primarily at a transactional level only. Third, it considers medical decision making to be separate from business decision making. Review of environment and information system technology changes suggests that hospital administrators need to take a more integrated view. General systems theory provides a foundation on which to propose a framework for SIS development reflecting these changes.

General Systems Theory Guidelines

A SIS architecture should be developed which reflects a systems perspective of strategic decision making within a hospital. Numerous researchers have provided input into the development of general systems theory (Kast and Rosenzweig, 1971). Key concepts from systems theory are helpful in specifying guidelines for strategic information requirements analysis and are incorporated in the following discussion. This architecture should:

- Identify projected as well as current information needs;

- Represent hospital strategic decision making process as both holistic and differentiated;

- Be hierarchical in nature. A SIS should support all levels of management (to varying degrees). Hofer and Schendel (1978) describe a four-tiered strategic planning process: corporate (what business is the hospital in), strategic business unit (how should the hospital compete in that business), functional area (how does the hospital maximize resource productivity), and operational (how does the hospital implement the strategy efficiently?).

- Identify the essential exchanges of information with the environment (open systems view) to protect against entropy. Strategy formulation, and hence SIS development, is inherently situational and evolutionary, constantly attempting to match the chosen strategy with the internal and external situations (Thompson and Strickland, 1983). A SIS's ability to identify when and how to reformulate strategies is necessary with changes in regulations, demographics, organizational structure, or market characteristics.

- Represent a transformational model. The SIS should identify alternative analytical processes that can be performed on the inputs within each dimension.

- Permit a systematic integration of each dimension of hospital strategic decision making while promoting service differentiation, internal elaboration, and a higher degree of organization within the hospital. Some hospitals have successfully integrated the operational and, to some extent, tactical aspects of clinical and business dimensions (Priest, et al., 1988a, 1988b). This initial step of data integration is necessary to permit the overlapping of these functional areas for higher-level strategic decision making activities.

- Promote a synergistic setting. This phenomenon can be described as a "funnel" effect where all decision making functional areas "come together" for top-level strategic planning. The strategic planning dimension addresses multiple objectives and area interdependencies.

Hospital Strategic Information System Formulation Process

Just as the development of a hospital's goals is a formalized process, the formulation of a hospital's SIS should be managed and not left to chance. This research proposes two phases of the SIS formulation process: organizational analysis; and, SIS development.

Organizational Analysis

The first two activities involve organizational analysis of the hospital's current position within the environment and the development of the hospital's vision and goals.

Internal/External analysis (position analysis).

An internal/external analysis should be conducted to obtain an understanding of the organization's position in the environment. It should determine the hospital's strengths and weaknesses, analyze its financial and clinical performance, evaluate its services, medical personnel, and administrators, and define its service area. The analysis process determines skills or services that the hospital can export to its environment as well as import from the environment those skills and services needed to improve its competitive status.

Organizational Goal Setting.

After hospital administrators have taken a critical look inward and have a better understanding of the hospital's position in the environment, it is appropriate to create a vision of the future and, using this vision, establish goals for strategic information management and for the organization as a whole. A vision sets a direction for the organization and thus offers stability in decision making. Information technology, when incorporated within a strong strategic plan, has been shown to be important to the success of many firms (Strassman, 1984). Therefore, when creating a vision, the hospital administrators should solicit input from the information systems specialists on new and forthcoming information technologies which might impact on the hospitals planning. The vision and goals can then be used as a guide in the development of standards and selection criteria for determining the types of information and analysis techniques that should be included with a hospital's SIS. These standards and criteria in turn can help translate the vision into specific strategic and operational objectives (Hejna and Hosking,. 2004).

SIS Development Framework

Since a SIS's purpose is to support an organization's competitive strategy, the framework for developing a SIS should be flexible and dynamic so that the hospital can adjust quickly to environmental changes and "stay on course" with its vision. The framework should permit the hospital to attain a state where it remains in dynamic equilibrium through the continuous exchange of physical and informational resources with the environment. The framework offered here separates the SIS development into three activities: SIS goals assessment, strategic information requirements analysis (SIRA), and SIS implementation planning.

SIS Goals Assessment.

The first activity assesses SIS goals and position relative to the organization and establishes specific SIS objectives. The four steps within this activity include:

1. Establish a SIS Vision Statement.

2. Conduct an internal and external analysis of the SIS. The internal analysis should indicate whether the system is deviating from a prescribed course. More specifically, this analysis should clarify current SIS capabilities, specify the current SIS applications portfolio, determine the SIS image, determine the stage of SIS maturity, and assess the administrative, medical, and information specialists skills level (Bowman, Davis, and Wetherbe, 1983). The external analysis should consider all environmental elements - the economic system, technology, society, government, customers, suppliers, labor, stockholders/owners, and competitors (Luchsinger and Dock, 1976). Through this analysis, opportunities for expanding the SIS and incorporating new technology should be identified.

3. Specify SIS Goals. These goals should directly correspond to and complement the hospital's organizational goals and strategies.

4. Establish Specific SIS Objectives and Strategies. The objectives of a hospital SIS should include assisting in: organizational objective reformulation and evaluation; major strategic issue identification; and, resource allocation.

Hospital Strategic Information Requirements Analysis.

The second activity develops an architecture for specifying strategic information requirements within a hospital. The need for strategic planning is being increased by hospital's external environments and their internal changes in hospital organization and management (Kropf and Greenberg, 1984, Milstead, 2002). These changes are causing a greater need to

plan and monitor the use of all resources to create a competitive advantage. Hence, strategic planning and decision making should be concerned with multiple aspects of the four dimensions of SISs (clinical, administrative, financial, and environmental).

      Clinical Dimension (Service Development). The clinical dimension is concerned with service development and patient care activities. Techniques include admission policy evaluation; patient admission/discharge projection and analysis; services offering analysis; and, diagnostic and therapeutic procedure projecting, planning, and monitoring. This information is passed along various stages of the hospital process, from laboratory to office files.

      Clinical/Administrative Dimensions (Medical Personnel Management). The patient care aspects administratively oriented involve medical personnel. The activities include recruitment, training, evaluation, and promotion of medical personnel. By reviewing peer data, a hospital can determine its clinical policies' strength. These reviews can be used to identify gaps in service offerings or medical personnel skills and determine whether the hospital is better off servicing customers using a full-service or a targeted approach. There are a number of techniques used for these activities: physician investment index, medical staff analysis, physician segmentation, physician service area definition and evaluation, risk analysis and sensitivity analysis.

      Administrative Dimension (Resource Allocation/Utilization). The administrative dimension is concerned with projecting, planning, and monitoring allocation and utilization of resources. These resources include non-medical personnel, supplies, capital expenditures and facilities management. A SIS should help administrators respond to change quickly, handle more responsibility as required, assist in internal communication as well as in the functional areas necessary to control hospital internal operations. Techniques include utilization analysis, facilities planning model, personnel effectiveness ratio, and facilities management model.

      Administrative/Financial Dimensions (Financial Position Analysis). Financial position analysis is concerned with efficiency and effectiveness of resource management with respect to fiscal factors. Techniques for hospital position analysis include credit policy analysis, collection policy analysis, and free service level analysis. The data used should include external data, such as industry norms, to permit corrective actions or developmental actions to take place.

      Financial Dimension (Fiscal Analysis). The financial dimension is concerned with a hospital's monetary aspects. It is essential that a hospital determine expected earning potential and the strengths and weaknesses of financial strategies. A hospital's financial performance can be assessed by analyzing ratios and reviewing and projecting financial trends. This assessment is necessary for the hospital to select a proper strategy and course of action. Other techniques include budgeting, cost containment policy analysis, rate setting analysis, and cash-flow analysis.

      Financial/Environmental Dimension (Market Dynamics - I). Financial activities which are environmental in nature include reviewing government reimbursement policies, payment trends, grants available, and financial markets as well as performing peer comparisons. Techniques include: payment trend analysis and financial markets evaluation. These data and techniques lay the foundation for state-controlled data group comparisons and internal cost-benefit analysis.

      Environmental Dimension (Environmental Analysis). The environmental dimension of a SIS should assist with evaluating the environment and proposing alternatives for strategically maneuvering it to maintain or change the hospital's position within the environment. Environmental analysis should begin with identifying major pressures on a hospital and continue to monitor and evaluate further changes in the environment and their implications for the hospital. Analytical techniques which should be incorporated within this dimension include: vendor performance analysis, medical personnel "availability" trend analysis, financial markets evaluation, "stockholders/ owners evaluation", competitor analysis (competitor response profile, service location analysis, demographic estimations/projections, industrial relations analysis, and short-term and long-term forecasting. External data used with these techniques can be obtained from in-house research or from private and government data services (Cerne, 1988).

      Environmental/Clinical Dimensions (Market Dynamics - II). Prior to establishing or reevaluating hospital strategies, administrators need to identify and analyze trends in environmental factors regarding changing consumer target markets either in terms of a geographic area or a population segment. Techniques for evaluating environmental aspects specifically related to patient care include: community needs analysis, public image analysis and promotion, publicity and service promotion analysis, patient satisfaction analysis, malpractice analysis, patient referral tracking, and government regulation impact analysis.

Master SIS Implementation Plan.

Using the architecture specified in the previous activity, hospitals need to develop a master implementation plan. Steps a hospital should follow include:

1. Define SIS projects. A hospital needs to identify potential SIS projects while taking into account environment opportunities, internal and external constraints confronting the hospital, and the hospital's vision.

2. Prioritize SIS projects. The framework, in conjunction with the organization and information goals, can be used in planning a phased SIS implementation. For instance, if an organization's goal is service diversification then SIS development priorities should be placed on environmental and/or clinical dimensions.

3. Construct a long-term development schedule founded on prototype and phased development techniques to permit feedback and immediate benefits. A SIS should be viewed as an evolutionary process requiring successive revisions to reach the ideal system. To provide administrators with timely access to information necessary for strategic decision making, the integration of databases and of functionally adjacent systems are imperative (Johnson, 1987).

4. Develop Resource Requirements Plan. This step begins with a resource utilization and availability trend analysis. This plan should address physical and informational resources. Physical resources include storage, processing and communication hardware and software, MIS and administrative personnel, supplies, facilities, and financial means. Informational resources include administrative, clinical, financial, and environmental dimensions (Hejna and Hosking, 2004).

Summary

Hospital executives must remain sensitive to rapidly changing environments and take an active approach to managing a hospital. The number of environmental factors affecting performance has greatly increased and the interaction between internal hospital management and these factors has intensified. Management uncertainties have increased with lack of predetermined guidelines needed to respond to these interactions. A well-founded SIS will provide flexibility and quick information necessary for hospitals to make good decisions.

References

Bowman, B., Davis, G. & Wetherbe, J. (1983). Three Stage Model of MIS Planning. *Information & Management* 6, 11-25.

Cerne, F. (1988). External Data Can Improve Strategic Planning. *Hospitals*, (April 20), 85-86.

Gordon, D; Carter, M.; Kunov, H; Dolan, A; & Chapman, F. (1998). A strategic information system to facilitate the use of performance indicators in hospitals. *Health services management research* 1998 May; 11 (2), 80-91.

Hejna, W. J., and Hosking, J. E. (2004). Five Critical Strategies for Achieving Operational Efficiency. *ournal of Healthcare Management, 49(5),* 289-292.

Hofer, C., and Schendel, D. (1978). *Strategy formulation: Analytical concepts*. St. Paul, Minn: West Publishing Company.

Johnson, K.F. (1987). Integrated System Brings Hospital Data Together. *Health Progress*, 68(8), 46-49, 82.

Iacovou, C.L. (1999). The IPACS project: when IT hits the fan. *Journal of Information Technology, 14,* 267-275.

Kast, F.E. & Rosenzweig J.E. (1972). General Systems Theory: Applications for Organization and Management, *Academy of Management Journal*, (Dec), 447-465.

Kim, K. K, & Michelman, J. E. (1990). An Examination of Factors for the Strategic Use of Information Systems in the Healthcare Industry, *MIS Quarterly, 14(1)*. 201-215.

Kropf, R. & Greenberg, J. (1984). *Strategic Analysis for Hospital Management.* Maryland: Aspen Publishers, Inc., 3-5.

Luchsinger, V. & Dock, V. (1976). Organizational Systems. The Systems Approach: A Primer.

Milstead, J. (2002). LeapfrogGroup: A prince in Disguise or Just Another Frog? *Nursing administration Quarterly, 26(4),* 16-25.

Priest, S.; Arena, P.J.; Cadieus, R.; Darling, M.; Dolan, C.; Duggan, S.; Grenberg, J: Maher, J.; Marcello, D.; Sarcione, J.; Sokol, J. & Tisch, C. (1988a) Implementation and Application of a Hospitalwide Computer System, Part 1. *The Healthcare Supervisor*, 6(3), 38-51.

----, (1988b) Implementation and Application of a Hospitalwide Computer System, Part 2. *The Healthcare Supervisor*, 6(4), 45-57.

Rackoff, N., Wiseman, C. & Ullrich, W.A. (1985). Information Systems for Competitive Advantage: Implementation of a Planning Process. *MIS Quarterly*, 9(4), 285-294.

Shaffert, T.K. & McDowell, C.E. (1978). Hospital Information Systems: An Overview. *Topics in Health Care Financing,* 4(4) 6-7.

Strassman, P.A. (1984). Value-Added Productivity Measurement: Concepts and Results. *EDP Analyzer* (June), 13-14.

Thompson, A.A., Jr., & Strickland, A.J., III. (1983). S*trategy Formulation and Implementation: Tasks of the General Manager*. TX: Business Publ., 31-35.