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The alignment of information systems with organizational objectives and strategies in health care☆

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ABSTRACT

Purpose: The alignment of information systems with organizational objectives and strategies is a key, contemporary challenge to organizations in general and the health care industry in particular. Researchers and managers alike believe that the selection of new information systems to support objectives and strategies focuses the organization on accomplishing its objectives and realizing the value of the investments in the systems. The purpose of this study was to help understand alignment in health care so that health care information systems planners can better achieve it.

Methods: Structured interviews with 15 top information systems managers in health care organizations of various sizes and types inquired about organizational objectives and strategies, the process for choosing new information systems to support those objectives and strategies, and the concomitant facilitating and hindering managerial actions and organizational characteristics.

Results: In addition to identifying and elucidating specific objectives, strategies, processes for choosing new systems, and facilitating and hindering actions and characteristics, the study used the data to characterize a generalized process of alignment in health care organizations.

Conclusions: The study contributes by confirming that alignment is a significant issue in health care organizations, and that such organizations make deliberate efforts to achieve it. The study further contributes by providing tables of actions and characteristics that managers might use as checklists in current and future alignment efforts as well as in generally cultivating broad support for alignment. Finally, it contributes by suggesting future study of alignment's predictors and effects in health care organizations.

1. Introduction

Information technology is playing an increasingly central role in the U.S. health care industry [31]. This is because information systems investments can contribute greatly to improved service quality, operational efficiency, patient satisfaction, and patient care [11,12,26]. Even greater adoption and use of such systems in health care could save an additional $162 billion a year [29].

Despite the evidence that IS investments can deliver value to firms in the industry, organizations face a problem successfully deriving value from those investments. Although some health care information systems succeed, many fail in some way [3,17]. For example, electronic medical record systems

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frequently do not meet expectations [28]. One major reason for this disappointing outcome is the difficulty health care organizations have in choosing information systems that will actually support their organizational objectives and strategies [41].

The alignment of information systems in support of such objectives and strategies has been the top, or among the top, IT concerns of management in organizations in general for over two decades [6,25]. The even longer-standing presumption behind alignment is that when any area of an organization takes actions to support the overall strategy, those actions help achieve the objectives top management views as critical to the organization's success [10,37]. The results of the actions thus contribute more to the organization's performance [39]. In particular, when a specific area of the organization implements an information system to support the overall organizational strategy, the system provides a means to help top management realize its objectives and thereby enhance performance.

On the other hand, an organization's failure to align the information system with its strategies can result in lost opportunities, wasted resources, and consequent unfavorable performance [7,22,18]. The organization fails to acquire the information system that would enable it to support a strategy, achieve an objective, and contribute to performance (i.e., it loses opportunities), or it spends time and money acquiring an information system that does not support strategy, does not achieve an objective, and does not contribute to performance (i.e., it wastes resources). At the extreme, the decision makers' knee-jerk urge to imitate competitors, excessive fascination with new technology, and internal organizational politics with vocal users and intimidated managers can foil an organization's attempts to invest in information systems that actually support strategy. Clever software vendors with hints at impossible benefits can do likewise.

The alignment of information systems in health care is especially critical because such systems can contribute to the success of so many health care organizations [16,19]. The decision to implement an information system in a health care organization is difficult [14]. However, insufficient research has investigated how organizations in the industry overcome the challenges of deciding to invest in systems that will actually support their objectives and strategies. This study attempts to help understand alignment in health care by answering the following questions so that health care information systems planners can better achieve alignment:

- How do health care organizations attempt to choose new information systems that support objectives and strategies?
- What managerial actions and organizational characteristics enable them to do so?[1]
- What managerial actions and organizational characteristics hinder them in doing so?

[1] *Managerial actions* refer to decision maker behaviors, whereas *organizational characteristics* refer to longer-term circumstances that may be under limited or no control of those responsible for the desired outcome.

The meaning of strategic alignment is discussed next. Then, the research methods for collecting data are explained. The data analysis and findings follow. The paper concludes with a discussion of the findings as well as implications for health care industry managers and researchers.

2. Strategic alignment

A strategy is a long-term plan for achieving objectives, usually with regard to the characteristics of the current environment [4]. An organization typically documents a strategic plan to motivate specific actions and mechanisms to implement over a planning horizon. The organization attempts to operationalize the plan across its units [40].

The term alignment, in the context of the current study, describes the extent to which implemented information systems support the organization's objectives and strategies as defined in the plan [30,32]. Alignment contributes favorably to an organization's performance [5,8,34]. Many organizations recognize this, and vigorously pursue it [25].

Suppose, for example, an organization sets a financial objective, and implements a cost-cutting strategy to achieve it. The acquisition of a new, automated patient appointment scheduling system that phones patients with reminders (and frees employees from phoning them) could illustrate an information system that is aligned with this strategy, would fulfill the objective, and thus contribute to the organization's performance.

If the practice had but few employees and the acquired appointment scheduling system was expensive, it might reduce office labor but the system's cost might outweigh the labor savings. The acquisition would probably be deemed not aligned with the strategy, the objective not favorably impacted, and performance not enhanced.

Despite the value of alignment, achieving it has been challenging [8]. A variety of obstacles have been identified for organizations in general including IT staff failure to understand business issues and meet commitments, IT management lack of leadership and failure to prioritize satisfactorily, the lack of a close relationship between IT and business management, and the lack of senior executive support for IT [24]. However, the challenges of achieving alignment in health care organizations in specific have yet to be examined in much depth.

In health care in particular, growing social, political, and economic concerns are drawing attention to management practices, and planning is one such practice [15,35]. The potential contribution of the alignment component of planning has motivated interest in alignment in health care organizations [31,33]. In fact, alignment with strategy has been identified as a significant contributor to the realization of the expected payoff from information systems in health care [21].

At the same time, significant information systems failures have occurred in the industry [17,36]. In many cases, implementation difficulties and unrealized payoff can be traced to poor understanding or lack of consideration of the objectives and strategies of the organization during the process of deciding to implement the system [13,20,23].

The ultimate success of information systems may thus depend on the extent to which health care organizations consider their objectives and strategies in their information systems planning process (i.e., as they attempt to align the systems with those objectives and strategies) [35]. Accordingly, the research questions in this study attempt to characterize this planning process, and identify the concomitant circumstances that enable and hinder it.

3. Research methods

The current study employed a qualitative approach because of the variety of human and contextual factors that may affect alignment in practice [9]. The investigators conducted structured interviews following a script of well-defined, open-ended questions, and then probed further with extemporaneous ones [42]. The interviews were thus not mere question and answer sessions, but were interactive where information and interpretation flowed both ways.

For site selection, 20 health care organizations were identified in a mid-western U.S. city. To achieve variety in the subjects' responses and thus broader relevance, the organizations included acute care, chronic care, home care, outpatient services, and other facilities of various sizes. A phone call to each organization obtained the name, title, and contact details of the person responsible for choosing new information systems. Personalized letters were then mailed to announce the study, and follow-up phone calls invited participation. Three declined, saying they had no input into the information systems selection decision because it was made at the corporate level; one declined because the individuals responsible for the decision were no longer with the organization, and one was unable to meet within the time frame set forth for the study. Thus, individuals representing the remaining 15 organizations agreed to be interviewed, a reasonable number for a study such as this [1].

Ten of the organizations discussed one new information system implemented during the recent past, and the other five talked about two. As a result, 20 selection decisions were discussed in the study.

Interviewees were assured of anonymity and were offered a copy of the final report. Two authors were present at each interview. The average duration of each was 1 h with a range of 30–90 min. After the first two interviews, slight revisions were made to the script. Major topics discussed were:

- the organization's objectives and its strategy for achieving them;
- the decision process for the most recent major IS investment, and managerial actions and organizational characteristics that facilitated and hindered the process;
- the decision process for the second most recent major IS investment, and actions and characteristics that facilitated and hindered the process.

Both interviewers took extensive notes, which were combined into a single record for each organization. For data analysis, answers to each individual question from all organizations were merged to create a single document for each question. The researchers identified key categories of answers, and then totaled the interviewees whose individual answers either directly or implicitly fit into each category.

Table 1 identifies each organization by type, its interviewee, its size in number of employees, and the information systems decisions discussed. The table shows that the research considered a wide range of organizations and information systems, and that the organizations ranged in number of employees from 11 to 6630 with a median of 580 with four organizations having fewer than 100 and four having 1000 or more.

Table 1 – Research participants.

Organization	Interviewee title	Employees	Information system(s)
Rehabilitation center	IS Director	1000	Integrated patient management system
Outpatient services	IS Director	156	Dual server disaster recovery system
Home care	VP Retail Operations	91	Accounting and physician referral tracking
Outpatient services	Office Manager	35	Patient scheduling and accounts receivable system
Home care	Outsourced IT Consultant	300	Patient management system
Mental health institution	IS Director	580	Pharmacy system
Chronic care (nursing facility)	Business Office Manager	125	Bridge software & hardware[a]
Outpatient clinic	CIO	1180	Electronic medical record system & cardiology system[a]
Chronic care (nursing facility)	President/CEO	600	Hardware and operating system upgrade[a]
Acute care	Office Manager	800	Two different integrated hospital ISs
Acute care	CIO	3300	Clinical IS
Outpatient services	Business Office Manager	11	Document image management system
Chronic care (nursing facility)	Director of Nursing and VP	85	Accounting/patient management system upgrade & time card system[a]
Acute care	CIO	875	Medication administration system
Inpatient (acute care) and outpatient (clinic)	CIO	6630	Operating room IS & ERP system[a]

[a] Two information systems.

4. Analysis and findings

Each interview began by asking the study participant to identify the objectives of the organization. This was done to prepare the participants to answer later questions about how they choose information systems as well as to help the researchers understand the answers to those later questions. Participants identified and described various objectives. The researchers categorized these objectives as either *financial* or *patient care*.

All participants explicitly mentioned patient care. Such care was frequently codified in mission statements, but participants often further articulated their patient care mission in personal terms.

Five participants explicitly noted the financial objectives of their organizations. "Money is not a dirty word around here," said the operations manager of a home health care provider. Four of the respondents, including not-for-profits, implicitly referred to objectives with financial impact such as customer retention, patient volume, and return on investment.

Each interview proceeded by asking participants to identify the strategy of their organization to help them answer later questions about how they choose information systems and to help the researchers understand the answers to those questions. Most participants could describe the strategies their organizations used to achieve these objectives, although only a few were aware of a formal strategy document in the organization. Table 2 summarizes their five main strategies as categorized by the researchers and shows the number of organizations that identified each (only items with two or more mentions were included in this and subsequent tables to increase the likelihood of generalizability).

4.1. *Workforce development*

Workforce development was the most frequently cited strategy. This was perhaps not surprising, given the labor-intensive nature of most health care delivery, and the widely reported shortage of many health care workers [2]. The participants described many ways in which recruitment, retention, and training were used as a workforce strategy for achieving patient care and financial objectives. For example, recruiting employees who had the right cultural fit with the organization was mentioned as important to long-term patient care goals. "People either love us or they hate us; there's no in-between," said the president of a nursing home sole proprietorship, referring to the need to hire employees who accepted the culture created by his "hands-on" management approach. Participants also described their organizations' efforts to maintain the quality of life of employees and provide a positive and stimulating work environment.

Table 2 – Organization strategies.

Strategy	Number
Workforce development	6
Growth	4
Patient safety	3
Technology focus	2
Government regulation compliance	2

4.2. *Growth*

Some interviewees expressed that their organizations were contemplating or planning growth via either acquisition or expansion of existing facilities. In addition to providing increased revenues, some noted controlled, strategic growth as essential to meeting the growing health care needs of their communities as well as those of underserved communities.

4.3. *Patient safety*

Interviewee comments about administering medications and procedures so as to minimize errors suggested patient safety as a strategy. For example, interviewees described the establishment of procedures to ensure that the right drug is given in the right dosage.

4.4. *Technology focus*

Interviewee comments suggested maintaining technological sophistication as a strategy. A rehabilitation center, according to its written plan, included in its strategy its intent to "maximize use of state-of-the-art technologies to improve processes and outcomes throughout the health care system." Modern technology, according to the CIO of an outpatient clinic, not only can help provide enhanced health care but also can reinforce customers' feelings that they are receiving such care.

4.5. *Government regulation compliance*

Two interviewees suggested that they followed a strategy of complying with government regulation. The CIO of a mental health hospital reported that state government required his organization's investment in a pharmacy system. The CIO of a cardiology firm stated that the most recent and significant IS investment in his organization was a response to the HIPAA requirement for hospitals to install a remote disaster recovery system (Government regulation compliance is viewed as a strategy here because compliance can help organizations achieve the financial objective by avoiding costly penalties, and achieve the patient care objective by supporting regulatory requirements that promote such care).

Research Question 1: How do health care organizations attempt to choose new information systems that support objectives and strategies?

Participants were next asked to describe the process of choosing whether to make an IT investment. A dozen indicated that they made a conscious effort to choose new information systems to support their objectives and strategies. Five broad alignment processes emerged from their responses. The processes appear in Table 3.

Table 3 – Alignment processes.

Alignment process	Number
Formal evaluation process	7
Incorporation of IS investments in strategic business plan	3
Return on investment analysis	2
Board of Directors' approval of IT investments	2
Business objectives and strategies in request for proposal selection criteria	2

4.6. *Formal evaluation process*

Seven interviewees stated that their organizations used a formal process for evaluating IS investments as part of their effort to align information systems with their objectives and strategies. This process sometimes included the use of standing committees of departmental managers and IS professionals who discussed how the objectives and strategies were supported as part of the investment justification. One interviewee described a gap analysis that assessed the expected functionality of the proposed system to determine whether it would meet a real need.

4.7. *Incorporation of IS investments in strategic business plan*

Three interviewees acknowledged that information systems planning was an integral part of their strategic organizational planning, and that their organizational plan explicitly identified proposed information systems. Their organizations viewed IS investment as key to their success, and upper management discussed and evaluated IS investments, at least the larger ones, on an equal footing with other mission critical investments. "IT is part of the culture," according to the CIO of an outpatient clinic. He illustrated this by saying, "The Board [of Directors] liaison to the technology committee was a heavy proponent [of the new system]. He's now the Board president."

4.8. *Return on investment analysis*

Two interviewees said that their organizations performed a financial analysis to determine whether the IS investment yielded a quantifiable return. The analysis provided a check that the financial objectives of the organizations would be met.

4.9. *Board of Directors approval of IT investment*

Interviewees from two organizations noted that Board of Director approval of major IS investments helped them achieve alignment. The information systems staff and departmental representatives made recommendations, but Board involvement in the final decision confirmed that the recommendations actually aligned with organization strategy.

4.10. *Business objectives and strategies in request for proposal selection criteria*

The incorporation of specific organization objectives and strategies into the selection criteria in requests for proposal for IS investments provided a "reality check" on the value of the investments for two organizations. In one case, the formula used for evaluating bids included points for directly matching proposed systems features to organization objectives.

Research Question 2: What managerial actions and organizational characteristics enable health care organizations to choose new information systems that support objectives and strategies?

4.11. *Managerial actions*

The interviewers then asked the participants to describe any managerial actions within their organization that contributed favorably to the process of choosing new information systems to support organization objectives and strategies. Table 4 shows the three broad, enabling managerial actions and the number of interviewees who mentioned each.

4.11.1. *Visit sites*

Site visits can, according to the interviewees, facilitate the organization's attempt to align information systems with organizational objectives and strategies. Visits allow observers to see first hand the advantages of proposed information systems in other organizations, and thus to understand why the systems can be of value to their own organization. Unlike other site visits that help managers choose between competing vendor packages (e.g., when evaluating proposals), the site visits mentioned by interviewees in the current study were to enable the visitors to learn whether an IS might support a strategy in the first place. The outside consultant responsible for IT management in a home care agency stated that site visits were "eye-opening for those who made the trip."

"Site visits were key," said the CIO of an outpatient clinic with reference to a particular decision process, and added, "It [the cost of investing in a new system] is easier to swallow that way." He then asserted that a site visit could also help him determine that a proposed system would actually fix a problem in his organization. "You should bear business objectives in mind [when visiting sites] so that you can know this system makes things better or not," he said.

4.11.2. *Communicate objectives and strategies*

Interviewees expressed that their management encouraged communication about objectives and strategies throughout the organization. The CIO of an acute care facility stated the importance of such communication: "The key strategic initiatives are known across the board. . .we're all going after the same goals. I've worked [in organizations] when we didn't

Table 4 – Major enabling managerial actions.

Actions	Number
Visit sites	5
Communicate objectives and strategies	4
Involve clinical leaders in planning process	4

have that understanding of the strategic goals, and that is very challenging."

The IS director of a rehabilitation center illustrated the use of repetition in emphasizing communication. He said that he and his staff listen and restate a great deal to improve mutual understanding of the objectives and strategies, which can facilitate alignment.

The avoidance of IT jargon and the use of analogies also enhance such communication. The IS director of the rehabilitation center claimed, "We are good at analogies with non-IT ideas to help users understand the need for IT."

4.11.3. *Involve clinical leaders in planning process*

According to interviewees, involving clinical leaders in the planning process can help enable alignment. Leaders can use their expertise to provide input that helps explain how a proposed IS will support objectives and strategy, and thus they can help justify acquisition. Clinical leaders "were involved [in the planning process] from the outset," said the CIO of an acute care facility, and later had significant input into the final decision to implement an electronic records management system. He added, "My input may be important, but *they* have to live with it [the system]."

Because clinical leaders must "live with it," ignoring them in the initial planning process can cause the organization to disregard how (or even if) they will apply the information system to support the objectives and strategies. The CIO of an outpatient clinic illustrated the importance of the involvement of clinical leaders in the selection process: "They are involved, not just forced top-down."

4.12. *Enabling organizational characteristics*

The interviewers next asked the participants to describe characteristics of their organization that contributed favorably to the process of choosing new information systems to support objectives and strategies. Table 5 shows the three general organizational characteristics that emerged from their answers.

4.12.1. *Top management involvement*

Five interviewees commented that the involvement of top management in the IS investment decision motivated their organizations to select new systems that would support objectives and strategies. The comments indicated that senior executives in their organizations participated in the selection process, and consciously used the objectives and strategies as their criteria. The IS department director at a large hospital illustrated this involvement by stating that a senior management team review of major IS investment proposals during the selection process substantially improved the likelihood of the fit between the investments and strategies.

Table 5 – Major enabling characteristics.

Characteristics	Number
Top management involvement	5
IT value awareness	4
Organizational culture of learning	2

Another IS executive emphasized the role of the CEO in his organization in achieving its objective to "be the number one patient care provider" by adopting cutting-edge IT. "Because of him [the CEO], we are the first in [our city] to have a fully automated electronic health record system."

The involvement of top management in the information systems selection process also guarantees the necessary resource availability for the chosen IS. The CIO of a cardiology practice reported that he was released from a budget constraint because of the involvement of top managers who regarded their organization as "an implementation-driven company, not a price-driven company."

4.12.2. *IT value awareness*

Four interviewees commented that the understanding of the value of IT by the organization's stakeholders enabled the alignment of information systems investment with organizational objectives and strategies. In one case, top management recognized that a customized IS could help a large hospital increase its market share in support of its growth strategy. This recognition allowed it to choose a costly but appropriate IS because it would deliver more value. The CIO from the hospital said, "I am not limited to those systems that are free and cheap."

Some interviewees expressed that they were not concerned about stakeholder pressure that might stem from the lengthy period of value realization of a new information system. The stakeholders understood that the delivery of IT value involves a continuous improvement process. An interviewee from a private medical practice emphasized that the IT value awareness of its physicians enhanced their support during the selection process: "The doctors did not interfere much with what we were choosing. They just let us do our own thing."

4.12.3. *Organizational culture of learning*

According to interviewees, an organizational culture of learning facilitates efforts to align IS strategy with organizational strategy, particularly with the workforce development strategy. The CIO of an outpatient clinic thus reported that the eagerness to learn by the younger physicians (who accounted for about half of the total physicians in the organization) pushed the organization to invest in new cutting-edge information systems. The selection of the IS helped the organization achieve its workforce development strategy of providing quality of life for the physicians by allowing them to work at home.

Some interviewees asserted that an organizational culture of learning can reduce management concerns about potential employee resistance to change brought about by new information systems. Such a culture thus allows more latitude in the process of choosing new information systems. The CIO of one hospital illustrated this openness: "We have a pretty positive culture . . . New ideas are well received." The CIO of another hospital attributed success in the selection process to the willingness to change present in a learning culture: "Changes are difficult, but we are doing really well here . . . you don't see that in other places."

Research Question 3: What managerial actions and organizational characteristics hinder health care organizations in choosing information systems that support their objectives and strategies?

4.13. *Managerial actions*

The interviewers then asked the participants to describe any managerial actions that hindered their organization in the process of choosing new information systems to support their objectives and strategies. Table 6 shows the major impediments that emerged from their answers.

4.13.1. *Communicate ineffectively*

Three IS executives asserted that ineffective communication hindered the decision process. Ineffective communication about the reasons for needing a new information system and the benefits of the system may dampen the willingness of user community representatives to approve the investment. The CIO of a hospital explained that his staff needed to talk to the representatives more often and explain more clearly how a proposed system could really help their departments perform their jobs.

Similarly, the vice president of a retail medical equipment company explained that his organization's IT team could have more clearly explained a newly proposed system to users. The team should have done a better job of gaining user pre-acquisition decision buy-in, which would have increased the chances of successful post-acquisition implementation, thereby improving alignment with the organization's financial objective.

4.13.2. *Involve stakeholders too little*

According to three IS executives, involving stakeholders too little in the decision process may have hindered it. For example, the CIO of a medical center with a hospital and an outpatient clinic explained that his organization had not sufficiently involved three cosponsors of a project in the process of learning about the benefits of the proposed system. This lack of involvement had prevented the cosponsors from being forceful advocates of the investment. The CIO said of the cosponsors' ability to provide only limited support, "It's one thing to provide lip service; it's another to be an advocate."

A consultant to a home health care organization explained that limited user participation in the investment decision process substantially reduced eventual buy-in to the acquired system. The lack of buy-in inhibited participation in identifying detailed department requirements. Insufficient detailed requirements resulted in a system that did not address and thus did not align with the original objectives.

Table 6 – Major hindering managerial actions.

Actions	Number
Communicate ineffectively	3
Involve stakeholders too little	3
Conduct a disorganized decision process	3

4.13.3. *Conduct a disorganized decision process*

Three IS executives commented that lack of an organized decision process may have produced decisions to acquire systems that quickly became obsolete or that otherwise failed to meet user needs and thus failed to support strategy. The CIO of a mental health institution described his role in a disorganized decision process that had permitted an acquisition to become obsolete too soon: "I should have looked at things a little harder so that I could make an intelligent decision."

A consultant to a home health care organization described team member absenteeism during the investment decision process: "More than once I had to get up early in the morning and show up for a meeting, and then no one else was there. It's not a meeting if only one person is there." After the implemented system failed to perform as desired, and thus impeded the achievement of the financial objective of the firm, the consultant responded to a user complaint with, "Why didn't you tell me then?"

4.14. *Hindering organizational characteristics*

Five categories of characteristics hindering the decision process emerged from the interviews. Table 7 lists the characteristics and the number of participants who mentioned each.

Table 7 – Major hindering characteristics.

Characteristics	Number
Resistance to change	5
Lack of management support	5
Lack of IT understanding	4
Lack of resources	4
Complexity of organization	3

4.14.1. *Resistance to change*

Five interviewees indicated that they had trouble convincing high-level user community representatives to support investment in new systems. These representatives expressed concern about prospective changes to current routines that would cause objections from their staffs and themselves. Thus, they sometimes resisted advice to invest in the proposed system.

A CIO of a medical clinic suggested that older physicians questioned whether a proposed IT investment was the right thing to do. "There were some people who threw a fit." Similarly, the CIO of an acute care hospital commented, "Doctors don't like change – nobody likes change – but doctors *really* don't like change." One hospital executive asserted that the excuse, "Because we've always done things this way," was the basis of objection to new system selection, despite evidence that the new system would support the hospital's patient care objective.

4.14.2. *Lack of management support*

Five interviewees indicated that lack of management support hindered the process of choosing new information systems. A

CIO remarked, "You have to catch the CEO on a good day" when asking the CEO to support a new information systems project. Similarly, an IT staff member at a nursing home claimed that she had to do some convincing – that she had to plead – to gain support for her proposed IT investment.

The IT staff member at a medical practice commented that the doctors who owned the practice took proposed investments personally and questioned them in that context. The staff member quoted one who protested, "How would you feel if I came and told you that your salary this year is going to be $25,000 less because I need to buy new software?"

4.14.3. *Lack of IT understanding*

According to four interviewees, lack of IT understanding by both users and managers made it difficult to gain support for information systems decisions. The CIO of a rehabilitation hospital explained that when his staff questioned users about their needs, the staff sometimes had to simplify the questions to help the users see how IT could help them do their jobs, and thus support the objectives of the organization.

A president of a nursing facility parent company commented that convincing the owner to accept the need for technology was difficult because he did not understand it. "To my knowledge, he's never touched a keyboard or even turned a computer on."

4.14.4. *Lack of resources*

Often the IT department has no budget or a very small percentage of the organization's overall budget. Four interviewees mentioned a lack of resources, particularly financial support, as hindering the decision process. Without the proper resources the organization cannot make the necessary investment even if the investment would help it meet its objectives.

The CIO of a rehabilitation hospital explained that a lack of resources was a major problem. For example, if the hospital needed to choose between a new email spam prevention system and new physical therapy equipment, the more directly patient-related equipment would take precedence. Ideally, the CIO said that he "would like to have a larger part of the resources devoted to IT."

4.14.5. *Complexity of organization*

The complexity of the organization played a role in the difficulty gaining approval for proposed information systems acquisitions. For example, the IT staff member at a nursing home felt that a complicated, multilevel approval process hindered new information systems decisions by delaying them excessively.

In an acute care hospital, the involvement of the multiple sites of the organization hindered the approval process. The CIO stated that each site had its own wants and needs, and choosing new systems that met those wants and needs for all sites proved difficult.

5. Discussion

The actions and characteristics strikingly resemble the activities and influences within the steps typical of an organization's strategic planning where top management identifies its objectives and strategies, and then other areas of the organization propose plans consistent with them [27,38]. For more meaningful understanding, the authors arrange the facilitating actions (Table 4) and characteristics (Table 5) with the hindering actions (Table 6) and characteristics (Table 7) framed constructively, as well as the alignment process (Table 3) and related interviewee comments into the following steps. The steps represent a generalized approach to aligning information systems with organizational objectives and strategy to better realize their value within the context of health care organizations.

5.1. *Step 1: Identify organization objectives*

The process begins when executives responsible for administrative and clinical areas identify the objectives of the organization. The current study identifies two broad objectives in health care organizations, namely financial and patient care, but executives in the actual planning process would most likely provide more detail. For example, for financial objectives they might set revenue or profit goals within a timetable.

5.2. *Step 2: Identify organization strategy*

Having set objectives, the executives would identify the strategy that they would intend the organization follow to accomplish them. The study identifies five major strategies in the health care organizations—workforce development, growth, patient safety, technology focus, and government regulation compliance; again, executives would provide more detail about their particular choice of strategy. For example, if workforce development was the strategy, they might propose hiring to fill new positions with certain skills. They would promulgate their strategy to others who are responsible for areas in the organization such as the information systems department.

5.3. *Step 3: Envision information systems*

Key administrative and clinical area managers, including information systems managers, envision possible information systems to support the organization strategy from the previous phase. The involvement of clinical leaders is necessary because they bring extensive knowledge of key issues facing the organization. Effective communication, which encourages IT understanding and fosters IT value awareness among these individuals, enables more productive initial discussion and evaluation of ideas so that ideas with less potential can be discarded early and those with more potential can be developed. Some organizations incorporate the envisioned information systems into a formal organizational strategic plan in the previous phase.

5.4. *Step 4: Gain approval*

Advocates of the envisioned information systems confirm that the systems will support the organization's strategy and thus its objectives. They follow a formal evaluation process

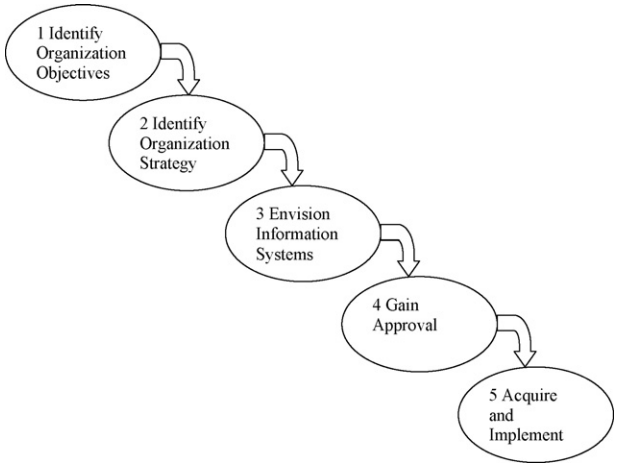

Fig. 1 – The alignment process in the healthcare organizations.

including return on investment or similar analysis to provide evidence to convince others to promote envisioned systems too.

Advocates seek approval for the systems from top managers, clinical leaders, and others. They arrange for these potential supporters to visit organizations that have implemented the systems to encourage the supporters to learn about the systems and develop enthusiasm for them. Advocates encourage top management support because without it funding for the eventual acquisition and implementation is less likely. They involve other stakeholders, including even selected end users, to decrease future resistance to new systems. They encourage an organization's culture of learning with opportunities for training and other forms of knowledge acquisition to increase receptivity to change and thus gain buy-in. They may seek high-level approval, such as by a board of directors, to confirm that a proposed information system is consistent with the organization's strategy.

5.5. *Step 5: Acquire/implement*

Project managers, along with end-user department and information systems staff involvement, acquire and implement proposed information systems to support the strategy and objectives. They may need to lobby for resources and gain approvals in multiple levels of the organization. To increase the likelihood that the systems support objectives and strategies, they incorporate the objectives and strategies into the evaluation criteria for vendor responses to requests for proposals for new systems.

Fig. 1 summarizes the steps. The arrows show the transitions from one step to the next. That is, the objectives enable the identification of strategy; the strategy enables the envisioning of information systems to support the strategy; the envisioned information systems provide a target for approval; and the approval permits acquisition and implementation of the approved system.

Summary points

What was already known:

- The alignment of information systems with organizational objectives and strategies is a key, contemporary challenge.
- Researchers and managers believe that the selection of new information systems that support objectives and strategies focuses the organization on accomplishing its objectives and realizing the value of the investments in the systems.

What this study added to our knowledge:

- Confirms alignment as a significant issue in health care organizations.
- Identifies five broad alignment processes, and actions and characteristics that facilitate and hinder the achievement of alignment for health care managers to use to align information systems with objectives and strategy.
- Characterizes the alignment process in health care organizations as a series of five steps so health care managers may ask themselves whether their own organization follows those steps to achieve alignment, or whether it should follow them more closely.
- Promotes awareness among researchers of the issue of alignment in health care organizations.

6. Conclusion: implications and contributions

Alignment of information systems with objectives and strategy has emerged as a critical issue in contemporary organizations. Executives and managers view alignment as the key to realizing the value of their information systems investments because it focuses the organization on achieving its objectives. However, alignment in health care organizations has not been studied extensively.

This study contributes by confirming that alignment is a significant issue in health care organizations. By identifying five broad alignment processes based on descriptions from 15 healthcare organizations, the study further confirms that such organizations do make deliberate efforts to achieve alignment.

The study further contributes by identifying actions and characteristics that facilitate and hinder the achievement of alignment. Taking into consideration differences in organizational size, function, and any other issues unique to their individual organizations, health care managers, especially those who seek to align information systems with objectives and strategy, can use the tables of actions and characteristics as checklists, and assess whether they do and should follow more closely the facilitating actions, and whether they do not and should not follow the hindering actions. They can also use the tables to assess the presence of the characteristics in

their organizations, and decide what they might do to cultivate the facilitating characteristics or to dampen the effects of the hindering characteristics.

The study further contributes by characterizing the alignment process in health care organization as a series of five steps. It thus recognizes and describes how such organizations seek to achieve alignment of information systems with objectives and strategy. Health care managers may ask themselves whether their own organization follows those steps to achieve alignment, or whether it should follow them more closely.

Finally, the study promotes awareness among researchers of the issue of alignment in health care organizations. Researchers might investigate alignment in health care by studying its predictors and its effects in such organizations with larger samples, stratified sizes and functions, and complementary methods.

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