Healthcare information systems outsourcing

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Abstract

Information systems (IS) outsourcing is a major decision for health care organizations. Analysis of outsourcing costs and benefits have to be made for the departmental or function-specific application of each system. Limited empirical studies have examined healthcare information managers preferences for IS outsourcing. In this paper we report findings from a national survey of more than 16,000 healthcare information managers in the United States, assessing preferences for outsourcing information systems. This included measures of: (1) IS functions most likely to be outsourced, (2) level of satisfaction with performance of healthcare information management (HIM) tasks, (3) factors influencing IS outsourcing decisions, (4) how a healthcare organization's degree of computerized patient record adoption affects the preference for IS outsourcing, and (5) regional differences in outsourcing policies. Six factors were found to influence managers IS outsourcing decisions, including improved patient care, cost savings, regulations, competition, trained staff availability and space considerations. Implications of the findings for healthcare information management outsourcing are discussed.
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1. Introduction

Rapid advances in information systems (IS) and corresponding regulatory mandates in the United States (US) healthcare industry have resulted in increased standardization of transaction processing, security, and privacy information under The Health Insurance Portability and Accountability Act (HIPAA) and other regulatory directives. In this environment analysis of outsourcing costs and benefits have to be made for the departmental or function-specific

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application of each system. Many organizations outsource to reduce costs and increase productivity (Yang & Huang, 2000). Development and operation of information systems are generally ranked first and second, respectively, as service most likely to be outsourced. Managing either of these activities and the transition between them involve significant and difficult organizational decisions (Roberts, 2001).

In US healthcare organizations, additional incentives and barriers confound the decision to outsource information management functions, especially related to outsourcing management of patient record functions. Today's healthcare enterprise often operates a growing number of delivery sites that are widely scattered and are often equipped with dissimilar computer platforms. The current rate of mergers and acquisitions continue to intensify these problems. As a result, progressive healthcare organizations are forced to continually rethink their strategies on how they can provide truly enterprise-wide access.

In response to growing information needs, a number of specialized companies have emerged with the sole purpose of helping hospitals and integrated delivery networks solve information access and document management problems through computerized patient record applications. Today in a full extranet environment, regardless of where they are located, healthcare users can immediately and simultaneously access any healthcare information across the Internet with complete security. Such systems require healthcare organizations to establish a private, secure network (a private network that utilizes internet protocols, and technology) which can scale gracefully to Internet protocols, support off-the-shelf browsers, and provide an intuitive look and feel throughout the organization, regardless of the client platforms installed.

2. Literature review

IS outsourcing decisions are important because their resolution involves significant organizational and institutional implications (Altinkemer, Chaturvedi, & Gulati, 1994; Ketler & Walstrom, 1993). Extensive outsourcing by healthcare organizations creates a market of vendors that other healthcare organizations can tap into to meet their needs (Burmahl, 2001). Internal sourcing, on the other hand, may create proprietary systems and limit technology transfer through vendors. Many believe that the less that healthcare organizations use outsourcing, the slower will be the development of industry-wide standards and practices across vendors.

Further confounding this process, however, is the emergence of strong cultural differences between international service providers, with disparate organizations more likely to adopt differential selective outsourcing (Willcocks, Lacity, & Fitzgerald, 1995). To date the growth of modular task outsourcing has been much more common in Europe. This will likely require organizations to have a global strategy to build up its understanding of the service market and related outsource strategies. The low risk approach will likely entail selective outsourcing, increased oversight capability while reducing internal costs, and improved internal efficiency. Alternatively, IS outsourcing can simply be turned over completely to the vendor, eliminating the need for self-justification or prescriptive cost-analysis. Ultimately, the quality of service and price are the key indicators of such performance.

Examining this issue, Wholey, Padman, Hamer, and Schwartz (2001) surveyed the determinants of health maintenance organizations (HMOs) IS outsourcing. Some 50% of HMO's outsourced

IS functions. HMOs were less likely to outsource day-to-day IS activities than more complex or development functions. Additional studies have attempted to produce some degree of structure related to the management of outsourcing efforts within organizations. Ngwenyama and Bryson (1999) identified key aspects of organization outsourcing strategies, and Venkatesan (1992) identified that commodity operations were most likely to be outsourced. Yang and Huang (2000) likewise provide a good overview of IS outsourcing practices and research, reviewing studies of IS outsourcing and examining how IS outsourcing is a critical issue facing IS management. They identified five factors, including management, strategy, economics, technology and quality, that should be considered for outsourcing decisions.

Pinnington and Woolcock (1997) further argued that IS/IT outsourcing studies to date mainly consider the client perspective, providing diagnosis and prescription data for client research management, while paying little heed to IS/IT vendor company perspectives. Focusing on vendor supplied IS services in the UK, they suggested that to better understand change in the IS function, client and vendor strategy should be conceptualized as a professional service within an organizational environment. They identified alternative strategies from qualitative reports, using an adaptation of Baker and Faulkner's (1991) strategies for managing suppliers of professional services and archetypes. They concluded that vendor company contribution to IS/IT organizational structure and competence will be facilitated by reciprocal and preferred vendor strategy. Few studies have specifically focused on identifying the factors influencing information systems outsourcing decisions in healthcare organizations, however.

Within this framework, in Section 3 we discuss the research questions and Section 4 the research design used in our study. Section 5 reports findings from our survey of more than 16,000 U.S healthcare information managers regarding their outsourcing preferences. Section 6 discusses our findings in more detail and proposes a decisions model for healthcare IS outsourcing.

3. Research goals

The overall goal of our study was to identify the current state of IS outsourcing in US healthcare organizations. The specific objectives of our study were to determine:

1. Healthcare IS functions most likely to be outsourced.
2. Level of satisfaction with performance of healthcare information management tasks.
3. Factors influencing healthcare IS outsourcing decisions.
4. How a healthcare organization's degree of computerized patient record adoption affects preference for IS outsourcing.
5. Regional differences in outsourcing.

4. Research design

Data from a nationwide survey of 16,591 US accredited healthcare information managers served as the basis for this study. Survey data were combined with the American Hospital Association Annual Survey, the US Census, Interstudy Inc. publications, state and regional health

service departments, and *The Market Statistics Report* and were used to examine the organizational and environmental characteristics of information practices in a variety of healthcare settings. A comparison of selected practice characteristics was made across practice settings, geographic areas, and selected healthcare demographic indicators. The survey data included measures of reported information management outsourcing and degree of computerized medical record adoption.

4.1. Survey

The survey, completed in May of 1999, was funded by the Foundation of Record Education (FORE), and was intended to assess the needs of the healthcare industry for more timely and frequent practice information in the field of health information management. No comprehensive study of this kind has been available in the past. The goal of this undertaking was to establish a source of practical, comparative information that can be used in both strategic planning and day-to-day practice. This project was designed to allow ready access to ideas and innovations that other professionals have used in solving management and technology problems common to many organizations. This study was designed to provide data on practices related to health information and computerization of patient records.

4.2. Sample design

The initial survey was initially fielded in June 1998, with follow-up assessments through May 1999. It was designed to provide representative information on the population of health information managers. The sample included respondents from a variety of practice settings and job titles and excluded students. The survey obtained data from 16,591 health information managers, for a 50.4% gross response rate. Samples for surveys were selected from a database of certified health information managers provided by the Foundation for Record Education (FORE), and contained current and historical information on all credentialed health information professionals in the United States. The data included on the population surveyed were obtained primarily from membership renewal forms and from an annual member profile mailed to all active members. Preferred mailing address data were obtained from the member population from those members with changes in address or professional status. These changes may be signaled by input from periodic mailings or by other correspondence.

4.3. Survey questions

Questions in the survey were designed so that managers from a variety of practice settings and work roles were asked about issues generally relevant to the profession overall. Topics were formulated and pre-tested by convened groups of practicing information managers, and represented a broad range of activity areas. Questions that had not been used previously in any known surveys of health information professionals were pre-tested prior to the survey fielding to evaluate the wording and ordering of questions and to determine the ability of respondents to provide the desired information.

4.4. Field procedures

Prior to the survey mailing, announcements were made through professional publications and meetings to inform members of the upcoming survey. A preprinted questionnaire was mailed to all credentialed health information managers who had identifiable mailing addresses. An instruction letter accompanied the form and explained the purpose of the survey and instructions for completion. At the six-week point following the last wave of the initial mailing, a second mailing was sent to those who had not responded. Follow-up on specific issues identified after the second mailing was accomplished through a series of more focused studies. An independent testing and research firm, National Computer Systems of Minneapolis, MN, which processed forms weekly over the length of the study, processed the questionnaires. Region-specific response rates were tracked to ensure that the mailings were received in a timely manner. Strict adherence to confidentiality standards was maintained in this study. Data were entered via a computerized scanning system and released only in aggregate form, without identification of individual respondents. Related preliminary findings were reported elsewhere (Lorence, 1999).

In the process of collecting demographic and practice setting information on health information managers, they were asked the following:

1. Which of the following functions would likely be outsourced to external vendors or consultants?
2. Overall, when are you most satisfied with the quality of performance of health information management tasks?
3. What is the single greatest factor influencing your facility's decision to outsource information resources?
4. How does a healthcare organization's degree of computerized patient record adoption affects the preference for IS outsourcing?

Responses were cross-tabulated by categories of computerized patient data adoption, and by key demographic variables. Resulting means were tested using a two-sample *t*-test, assuming unequal variance, with α at 0.05 and 0.10.

5. Results

5.1. Healthcare IS functions most likely to be outsourced

Table 1 shows the healthcare IS functions most likely to be outsourced. Transcription, microfilming and information release functions were more likely to be outsourced. Few organizations outsourced a major proportion of their HIM services or management.

We also examined the healthcare IS functions most likely to be outsourced when healthcare organizations have different levels of patient data computerized. A significantly higher percentage of respondents with 51–75% computerized patient data (37%) report "information release" functions are likely to be outsourced to external vendors or consultants, compared to respondents with 0–50% and 76% or more (25%) computerized patient data. When reporting *none* of the functions listed would likely be outsourced to external vendors or consultants, respondents with

Table 1
Healthcare organization IS functions most likely to be outsourced to external vendors or consultants

IS functions	%*
Transcription	38.7
Microfilming	37
Information release	25.3
Imaging	10.4
Coding	8.5
Registries	6.2
Fileroom	4.1
All HIM services	1.5
All HIM management	1.1
None	32.1
Total	100

*Note: percentages may not add to 100 due to rounding.

0% computerized patient data (44%) are significantly different from respondents with 1% or more computerized patient data.

We then examined the healthcare IS functions most likely to be outsourced when healthcare organizations have different levels of encoding. Respondents who encode and report ''information release'' as a function likely to be outsourced to external vendors or consultants (34%) are significantly different from respondents who do not encode (15%). More than four in ten (44%) of the respondents who do not encode report *none* of the functions listed would likely be outsourced to external vendors or consultants, a significant difference compared to respondents who encode (20%).

5.2. Satisfaction with healthcare IS outsourcing quality

Table 2 shows when healthcare managers were most satisfied with the quality of performance of HIM tasks.

Most respondents were satisfied with the overall quality of outsourced HIM tasks performed. We examined the healthcare IS functions most likely to most satisfied with the quality of performance of HIM tasks whether done *in-house or outsourced* for respondents with differing levels of patient data computerized. Respondents with 1% or more computerized patient data are more likely to report they are most satisfied with the quality of performance of HIM tasks when done *in-house*, than respondents with no computerized patient data (71%). Respondents with no computerized patient data (27%) are significantly different from respondents with 1% or more computerized patient data for reporting they are satisfied with the quality of performance of HIM tasks, when done *in-house or outsourced*.

We then examined the healthcare IS functions most likely to most satisfied with the quality of performance of HIM tasks whether done *in-house or outsourced*, for respondents with differing levels of encoding. Respondents who encode (77%) are significantly more likely to be satisfied with the quality of performance of HIM tasks when done *in-house* than respondents who do not encode (74%). Approximately one-quarter (24%) of the respondents who do not encode report

Table 2
When are you most satisfied with the quality of performance of HIM tasks?

	Total %
In-house	74.8
Outsourced	2.9
No difference	22.3
Total	100

they are satisfied with the quality of performance of HIM tasks, whether done *in-house or outsourced*. This is a significant difference compared to respondents who encode (20%).

5.3. Factors most affecting healthcare IS outsourcing decisions

Table 3 shows the factors influencing IS outsourcing decisions. The major factors influencing healthcare IS outsourcing decisions are the need to improve patient care and save money.

We examined the factors that influenced IS outsourcing decisions for healthcare organizations with differing levels of patient data in computerized form. When reporting improving patient care is the single greatest factor influencing the decision to purchase information resources, respondents with 26% or more computerized patient data are significantly different from respondents with 0–25% computerized patient data. Respondents with 0% computerized patient data (25%) report a significantly higher percentage than respondents with 1% or more computerized patient data, for reporting an "Other" factor as the single greatest factor influencing the decision to purchase information resources.

We then examined the greatest single factor affecting the purchase of information resources based on the level of encoding by the organization. Respondents who encode and report improving patient care as the single greatest factor influencing the decision to purchase information resources (40%) are significantly different from respondents who do not encode (30%). Respondents who do not encode (21%) report a significantly higher percentage for an "Other" factor as the single greatest factor influencing the decision to purchase information resources, compared to respondents who encode (12%).

5.4. Healthcare IS functions most likely to be outsourced—based on organizational variables

Table 4 shows functions likely to be outsourced to external vendors or consultants based on various organization variables.

5.4.1. Metro versus non-metro areas

Non-metro area respondents with a 25–49.9K population density (34%) are significantly more likely to outsource "transcription" functions to external vendors or consultants than respondents with a population density of less than 25K (24%). A significantly higher percentage of non-metro area respondents with less than 25K population density (38%) would *not* outsource any of the functions listed to external vendors or consultants, compared to respondents with a 25–49.9K population density (32%). A significant difference from respondents with a 1 million or less

Table 3
What is the single greatest factor influencing your facility's decision to purchase information resources?

	Total %
Improve patient care	35.5
Save money in the long run	22.3
Fear of regulators or accrediting agencies	9.7
Keep up competitors	6.6
Availability of trained staff	5
Space	4.4
Other	16.7
Total	100

population density, almost one-half (45%) of the Metro area respondents with a population density of greater than 1 million report "transcription" would likely be outsourced to external vendors or consultants. Metro area respondents with less than 250K population density (41%) are significantly more likely to outsource "microfilming" functions to external vendors or consultants than respondents with population density of 250K + .

5.4.2. Level of HMO enrollees

Respondents with 11% or more HMO enrollees report "transcription" functions are likely to be outsourced to external vendors or consultants, a significant difference compared to respondents with 1–10% HMO enrollees (34%). Respondents with 1–30% HMO enrollees are significantly more likely to outsource "microfilming" functions than respondents with over 30% HMO enrollees (30%).

5.4.3. Number of outpatient visits

"Transcription" functions are likely to be outsourced to external vendors by respondents with over 98K hospital inpatient visits (44%), when compared to respondents with 1–30K hospital inpatient visits. For reporting "microfilming" functions outsourced to external vendors or consultants, respondents with 1–30K hospital inpatient visits are significantly different from respondents with 30.1K or more hospital inpatient visits. More than four in ten (43%) respondents with over 98K hospital outpatient visits report "transcription" functions are likely to be outsourced to external vendors or consultants, a significantly different percentage compared to respondents with 1–30K hospital outpatient visits. Respondents with 1–30K hospital outpatient visits are significantly more likely to report "microfilming" functions outsourced, compared to respondents with 30.1K + hospital outpatient visits.

5.4.4. Managed care expenditures

Respondents with over $150 in managed care expenditures (44%) are significantly different from respondents with $0–$150 in managed care expenditures for reporting "transcription" functions outsourced to external vendors or consultants. "Microfilming" functions are outsourced to by respondents with $0 managed care expenditures (42%), a significant difference compared to respondents with $1 or more in managed care expenditures.

Table 4
IS functions likely to be outsourced to external vendors

	Total (A)	Non-Metro		Metro			Percent HMO enrollee				Hospital inpatient visits				Hospital outpatient visits				Managed care expenditures			
		<25K (B)	25K–49.9K (C)	<250K (D)	250K–1Mil (E)	>1Mil (F)	1–10% (G)	11–20% (H)	21–30% (I)	OVER30% (J)	1–10,5K (K)	10,501–30K (L)	30.1K–98K (M)	Over98K (N)	1–10,5K (O)	10,501–30K (P)	30.1K–98K (Q)	Over98K (R)	0 (S)	1–125 (T)	126–150 (U)	Over150 (V)
Base: Total sample (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Don't know/No answer	23.1	12.5	15.9	18.6	26.6	28	17.2	23.8	24.7	27.2	15.4	22.8	26.3	27.5	14.2	20.5	24.3	27.6	17.4	24.9	25.6	26.4
Base: Those responding (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100%
Transcription	38.7	24.2	33.6B	34.9	41.5D	44.7DE	34.4	39.9G	39.7G	42G	31.7	39.3K	41.5K	43.6KL	29.1	38.9O	40.8O	42.8OP	33.3	38.6S	40.3S	44.5STU
Microfilming	37	39.7	43.9B	41.2EF	33.9	31.3	40.8J	38.6J	38J	29.8	41.7MN	40.6MN	34.1	31.8	41.6QR	42.1QR	37R	32.3	41.8TUV	36.9 V	35.7 V	32.2
Information release	25.3	17.3	22.7B	23.5	26.9D	27.7D	21.1	27.4G	26.9G	26G	20.3	27.3K	27.2K	27.3K	19.5	26.2O	26.4O	27.4O	21.1	23.8	26.8ST	29.9STU
Imaging	10.4	11.4	9	10.5	9.3	11.1E	10.7J	10.4J	10.9J	8.7	10.5	10.4	9.8	10.3	10.3	10.2	11.2	9.7	10.7	10.1	10.3	9.6
Coding	8.5	4.2	6.5B	7.2	9D	11.3DE	6.6	9.4G	9.1G	9.4G	5.8	9K	9K	10.8KLM	5.4	8.2O	8.8O	10.2OP	6.7	8.2	9.8S	9.7S
Registries	6.2	6.3	5.6	6.1	5.3	8.1DE	6	6.7I	5	7I	6	6.5	5.3	7.4KM	5.4	7.7OQ	5.5	6.4	6.2	5.1	5.7	7.6STU
Fileroom	4.1	1.4	2.3	2.7	4.8D	6.8DE	2	4G	5.3GH	5.5GH	2	3.2K	4.9KL	6.4KLM	1.9	3.1O	4O	5.8OPQ	2.1	5.3S	5S	5.2S

Table 5 show what functions are likely to be outsourced to external vendors or consultants based on organization variables.

5.4.5. Practice setting

Hospital practice setting (48%) respondents report "transcription" functions are likely to be outsourced to external vendors or consultants, a significant difference compared to clinic (37%) and "Other" (19%) practice setting respondents. Nearly six in ten (59%) "Other" practice setting respondents report *none* of the functions listed would likely be outsourced to external vendors or consultants. This is a significant difference compared to hospital (18%) and clinic (39%) practice setting respondents.

5.4.6. Manager versus non-managers

Managers (28%) are significantly different from respondents with a job title other than Manager (23%) when reporting "information release" as a function likely to be outsourced to external vendors or consultants. Managers (13%) are significantly more likely to outsource "imaging" to external vendors or consultants than "Other" job title (8%) respondents.

5.4.7. Regional variation

One-half (50%) of New England region respondents are likely to outsource "transcription" to external vendors or consultants, a significant difference compared to Mid Atlantic (39%), East North Central (39%), West North Central (35%), South Atlantic (39%) and East South Central (34%) region respondents. West North Central region (43%) respondents are significantly different from New England (32%), Mountain (32%) and Pacific (22%) region respondents in their likeliness to outsource "microfilming" to external vendors or consultants.

5.4.8. Merger status

Organizations that have merged (45%) are significantly more likely to outsource "transcription" to external vendors or consultants than organizations that have not merged (35%). Organizations that have not merged (36%) are *not* likely to outsource any of the functions listed to external vendors or consultants. This is a significant difference compared to organizations that have merged (24%).

6. Discussion

The most important consideration for US healthcare organizations in the IS outsourcing decision is the impact of the decision on improving patient care. This finding is not surprising, given that the healthcare business that focuses on human care and medical services. This finding is similar to Yang and Huang's (2000) finding that the need to improve performance was a major factor in outsourcing decisions. In healthcare, the need is for improvement focused on patient care and cost savings.

Our results suggest that the decision to outsource is affected at least in part by how much of the information is computerized. Despite government mandates promoting the migration of patient data to computerized form, a significant amount of information in healthcare organizations is still

Table 5
Functions likely to be outsourced to external vendors or consultants

	Total (A)	Hospital (B)	Clinic (C)	Other (D)	Manager (E)	Other (F)	New England (G)	Mid. Atlantic (H)	E. No. Cent. (I)	W. No Cent. (J)	So. Atlantic (K)	E. So. Cent. (L)	W. So. Cent. (M)	Mount. (N)	Pacific (O)	Merger (P)	No Merger (Q)
Base: Those responding (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Transcription	38.7	48.2CD	36.6D	19.2	40.3F	37.7	49.5HIJKL	39.2	38.9	34.9	38.9	34	42.8JL	42.8JL	46.4HIJKL	45.4Q	35.2
Microfilming	37	47.7CD	24.2D	19.2	35.6	38.2E	32.4O	37.5O	41.3GNO	42.8GNO	38.9NO	40.4NO	38.0O	31.5O	22.3	41.5Q	35.1
Informationrelease	25.3	34.7CD	18.4D	8.4	28.1F	23.3	20.7	29.4GO	28.1GO	24.5	33.5GIJLO	25.9	34.9GIJLO	30.9GJO	21.8	31.8Q	22.1
Imaging	10.4	12CD	7.3	8.1	12.7F	8.4	5.9	9	11.8G	11.2G	12.8GHN	13.4G	16GHIJNO	8.7	9.9	11.6Q	9.9
Coding	8.5	10.7CD	3.2	5.4C	6.4	10.3E	8.5	8.3L	9LMN	7.6L	11JLMN	4.4	5.6	5.8	9.7LMN	10.2Q	7.4
Registries	6.2	8.6CD	2.4	2.7	7.4F	5.3	4.8	4.7	6.2	5.4	5.4	6.4	7.3	6.8	15GHIJKLMN	7.4Q	5.6
Fileroom	4.1	4.8CD	2.6	3.2	3.4	4.6E	5.9L	3.6	4.8JLN	2.6	3.1	1.7	4L	2.6	5.1JLN	5.4Q	3.4
All HIM Services	1.5	1.5C	0.8	1.4	1.2	1.7E	1.6	2.1M	1.3	0.7	1.8M	1.2	0.6	2.6M	1.4	1.6	1.3
All HIM management	1.1	1C	0.1	1.6BC	0.7	1.3E	1.6	1.7	1	0.9	2.2	1.2	1	2.9	1.2	1.4Q	50.7
None	32.1	18.4	38.6B	58.8BC	30.2	33.5E	29.8	31.5	31.9	31	28.4	32.8	28.9	36.7KM	33.3	24.5	36.1P

maintained in paper charts. While it might be expected that more paper-intensive operations would require a greater degree of contracted scanning, imaging, and digitizing of data now mandated under electronic data interchange (EDI) requirements, we find the opposite to be true. Organizations with a greater degree of computerized information were more likely to outsource these functions. It appears, then, that it is the technical, rather than the information management functions, which are more likely to be entrusted to external service providers.

We find further support for technical outsourcing bias when grouping management functions as a whole, compared to respondent-identified, non-management functions. Respondents consistently claimed the non-management functions were better suited for outsourced service. This may suggest a shift from the emphasis placed on management services by consulting firms and contract services. The message is clear regarding organizational preferences related to health information management: technical, rather than non-technical management, is the growth area for service providers and consulting businesses.

Our analysis highlights the associated non-uniform adoption of computerized patient records and the like variation in types of services likely to be outsourced. The data suggests that many organizations have adopted computerized patient records, but do not adopt similar preferences for outsourced information functions or services. For those organizations that do have a well-developed computerized patient information system, there appears to be a corresponding demand for information services. Specifically, technical, rather than management functions, are most sought after.

Of further note here was the association between greater adoption of computerized records and reported preference for outsourced functions. Generally, as organizations adopt CPRs (Computerized Patient Records) they appear to be more likely to outsource needed services. This lends some credibility to the argument that generally, greater external support is needed for more system-dependent environments, relative to a comparatively paper-based environment. The association effects, however, were not consistent across all system indicators.

Also of interest here was the evolution of outsourcing functions from a paper-based environment to a computerized environment. As seen here, among the more paper-based organizations, information functions were more likely the responsibility of internal managers. Among the organizations adopting a more complete electronic record, however, many information functions evolved to become the responsibility of external contracted sources. In effect, adoption of a more technology-based medium resulted in the greater likelihood of specialized technology-based management. The more specialized functions, such as tumor registries or medical imaging services, remained within the organization. In most industries, this may seem a logical result. In healthcare, however, such functions are often dictated by lawmakers, clinicians, and business managers, often without consideration of the capabilities or limitations of technology. It remains to be seen how well technology managers will be able to adapt to a highly regulated, policy-driven environment, often dominated by technology-averse healthcare providers.

Overall, non-management IS functions are more likely to be outsourced, especially where more use of computerized patient data results in increased demand for IS outsourcing. The impact of organizational factors in outsourcing preferences also suggests that outsourcing decisions, rather than being function-specific, may be the result of a more general level of comfort for outsourcing across the organization as a whole. This was suggested by Wholey et al. (2001), who argue that

there are externalities associated with the organization of transactions. They found that methods used in organizing a transaction create organizational capabilities to effect other transactions in a similar manner. As such, the methodological implication for studies of the make/buy decision is that researchers must explicitly control for the effects of organizational context in studies of outsourcing.

We expected a consistent preference for outsourcing for most all respondents, given the passage of stringent internal information management regulations mandated under recent federal laws. Instead, we found a significant variation in respondents regarding outsourcing adoption, which persisted across organizational and regional characteristics. Of interest here was the fact that, overall, little difference in outsourcing preferences was found between high and low adopters of computerized patient records. Whereas the increase adoption of computerized technology provides greater access to patient information, we would have expected to see an increased need for internal control and management. This lends some support to the theory that technology innovation itself does not always effect an a priori change in organizational practices, especially where they are ingrained in a traditional paper-based culture.

Also of note was that the preference for outsourcing of privacy-sensitive information functions, such as record release, often prevailed over less privacy-critical functions. Though technology is often touted as a means of achieving privacy and security of patient information, in this case the lower adoption of technology resulted in generally greater outsourcing. Those who reported higher adoption of computerized record technologies, however, were also likely to report greater use of outsourced services.

The preference for outsourcing was also inconsistent across quartiles, and could be due to a time lag between computerized record adoption and organizational behaviors or policies. Nevertheless, no consistent increase in implementation of computerized record adoption, or related outsourcing, was seen here with the increased adoption of computerized records.

A curious finding here was the increased use of automated coding systems associated with the increased likelihood of greater use of outsourced services. Generally, such automated coding systems require fewer personnel, and result in less overall access to information. Overall, the paperless office may be emerging in healthcare, though results here suggest it may not readily be able to disassemble contradictory, culturally ingrained organizational behaviors and practices.

As seen here, regional and demographic characteristics are associated with preferences for outsourcing of information management tasks. Such preferences ultimately rely on both internal and external organizational characteristics. Often, the perceived ability to manage such functions internally plays a key role in the decision to manage a given function utilizing internal resources. Characteristics specific to a given organization, as seen here, can thus be viewed as useful precursors of preferences for outsourcing.

7. Implications for managers

In an emerging evidence-based healthcare environment, information managers of clinical data and information system software will likely make greater use of structured procurement processes when assessing their system needs. This process should include, at a minimum, a requirements analysis, definition of key system tasks, and validation of vendor claims. Broader environmental

factors to be considered will include the nature of the managed care arrangements in the specific locality, the specialty or specialists involved, and the types of practice structure the system was designed for. Managers will further need to assess vendors for existing capabilities. Such a process involves scalability and customizability, RFP design, and development of objective evaluation criteria for vendor assessment. Organizations often make use of evaluation committees or hired consultants for this task, especially where extensive vendor demonstrations are needed which make use of organizational data. Site visits of existing service clients can also often be handled by evaluation teams or specialists, who can be retained to help select a vendor and develop an implementation plan, run live tests, and train clinical, management, and information systems personnel.

8. Conclusion

Factors which determine IS outsourcing decisions are affected by unique aspects of healthcare industry regulation and management. Ultimately, it will be up the manager to assess such risk in outsourcing their more critical IS functions. Strategic planning will no doubt provide a clearer picture for the manager as to what tasks, functions, or jobs are outsourced in any given organization. In the short run, the key question for managers will be: how does one choose and evaluate outsourced IS services in a paperless environment?

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