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Evelyn Thrasher
University of Massachusetts - Dartmouth

Terry Byrd
Auburn University

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Strategic Fit in Healthcare Integrated Delivery Systems: An Empirical Investigation

Evelyn H. Thrasher
University of Massachusetts - Dartmouth
ethrasher@umassd.edu

Terry A. Byrd
Auburn University
byrdter@auburn.edu

ABSTRACT

Using the healthcare integrated delivery system (IDS) as a distinct and useful example of an interorganizational network, the current study empirically tests a model of strategic fit for this level of analysis. In particular, this study examines the strategic fit between IT integration and sophistication and organizational maturity within the healthcare IDS. Secondary data obtained from HIMSS Analytics and the American Hospital Directory for 130 healthcare IDSs currently active in the United States is used to test the relationship between strategic fit and both average length of hospital stay and operational cost. In addition, statistical comparisons are made across two levels of IDS development. The results indicate a shortened length of hospital stay and reduced operational costs when strategic fit is achieved. Further, among those IDSs who have achieved strategic fit, high integration aligned IDSs seem to demonstrate significantly greater performance improvements than low integration aligned IDSs.

Keywords

Strategic fit, IT integration, healthcare IT

INTRODUCTION

Interorganizational networks have been defined as "clusters of organizations that make decisions jointly and integrate their efforts to produce a product or service" (Alter and Hage, 1993, p.2). Others have expanded this definition to include the primary goals of the interorganizational network as "advanced organizational structures perceived to improve efficiency, flexibility, and innovativeness and described as decoupled units developed because of rapid growth or knowledge and technology" (Schumaker, 2002). The anticipated value of interorganizational networks has been discussed for many years, with an emphasis on the ability to gain competitive advantage, improve financial performance, improve efficiency and effectiveness, and improve customer service (Borys and Jemison, 1989; Oliver, 1990; Schumaker, 2002; Straub, Rai and Klein, 2004). Yet, a lack of empiricism and establishment of well-developed models suggests this area of research is still evolving and is, therefore, in need of focused research attention (Oliver, 1990; Schumaker, 2002; Straub et al, 2004).

The purpose of the present research is to examine the phenomenon of strategic fit for the interorganizational network. We focus on the healthcare integrated delivery system (IDS) as a distinct and valuable example of an interorganizational network. IDSs are defined as networks of healthcare organizations linked for the goals of clinical integration and an effective continuum of patient care (Zucherman, Kaluzny and Ricketts, 1995; Kilbridge, 1998; Young and McCarthy, 1999; Deluca and Enmark, 2002). IDSs may take a number of organizational forms, namely strategic alliances, contracted networks, or joint ventures and may be made up of multiple forms within a single network (Page, 2003). The IDS lends itself well to an investigation of interorganizational networks due to the multiplicity of organizational structures and variance in the levels of IT integration and sophistication across different IDSs. Also of interest is the distinction of the IDS as a lateral network of stakeholders, all providing direct service to the patient. Thus, the goal of the current study is to use the healthcare IDS to empirically test a model of strategic fit that can be further refined and extended across other industries. More specifically, the current study examines the potential differences in the nature and strength of the relationship between strategic fit and IDS performance across two distinct levels of IDS development.

The conceptual model for the study is presented in Figure 1 and is tested using secondary data obtained from HIMSS Analytics and the American Hospital Directory for 130 healthcare IDSs currently active in the United States. We categorize the IDSs into two levels of development based on the alignment of IT integration and sophistication and organizational maturity; we label these levels High Integration Aligned and Low Integration Aligned. The relationship between strategic fit and IDS financial and quality performance is tested with statistical comparisons made between the two groups.

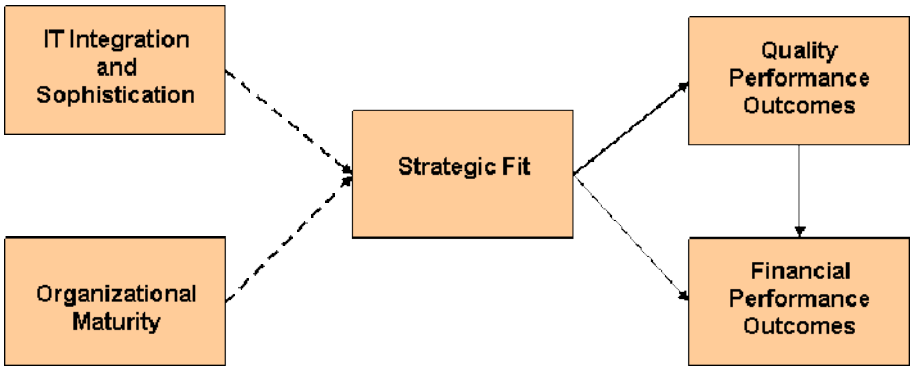

Figure 1. Conceptual Model of Strategic Fit for the Interorganizational Network.

RESEARCH MODEL AND HYPOTHESES

Strategic Fit

Henderson and Venkatraman's (1993) Strategic Alignment Model was founded on the theory that IT value for the organization should be greater when the organization's business and IT strategies are appropriately aligned. These authors defined strategic fit as a process of adaptation in which organizational changes must be supported by complimentary IT resources and integration (Henderson and Venkatraman, 1993). Similarly, Chan and Huff (1993) defined strategic fit as "the fit between business strategy and IS strategy" (p. 345). We adapt these definitions to define strategic fit as the point of equilibrium at which the level of interorganizational network structure and maturity is properly aligned with a complementary level of IT integration and sophistication.

In 1994 Venkatraman developed the IT-Enabled Business Transformation Framework as an extension of the Strategic Alignment Model. Venkatraman (1994) posited that IT is no longer simply an operational support resource, but rather a strategic tool with which to transform the organizational structure and processes of the firm. He further proposed that this strategic role of IT emerges more readily as firms begin to establish strategic alliances and partnerships, as is the case with interorganizational networks. In more advanced stages of organizational development, the need for, and benefits from, strategic fit are also expected to increase as interorganizational networks expand into more complex organizational structures (Venkatraman, 1994). Yet, little empirical evidence exists to support these suggestions. Much research around IT value and strategic fit has been conducted at the firm level of analysis (Chan, Huff, Barclay and Copeland, 1997; Bergeron, Raymond and Rivard, 2001), but research at the interorganizational network level of analysis is rare (Straub et al., 2004).

Of particular interest to the current study, some researchers have examined the differences in firm performance between organizations at different levels of strategic fit. Along these lines, Zajac, Kraatz, and Bresser (2000) demonstrated significant positive links between strategic fit and ROA in savings and loan organizations who achieved advanced levels of strategic fit. These authors empirically supported the argument that greater benefit is realized when organizations respond in a timely manner to needed changes in strategy and then achieve fit at this new level of development. On the other hand, those who fail to make changes or else fail to achieve fit once changes are made are less likely to realize financial benefits.

Similarly, in their study of small enterprises, Bergeron et al (2001) found that those organizations who had reached a high level of strategic fit realized improved financial performance. These authors examined strategic fit through a number of different lenses, looking at profile deviation, moderation, matching, and other perspectives of strategic fit as a means of measuring the performance impacts of fit. The results seemed to suggest that those organizations who pursue a highly strategic organizational and IT strategy tend to outperform organizations who fail to reach these higher levels of integration and organizational structure. Thus, these past studies lend support to the idea that perhaps a difference exists in how strategic fit relates to organizational performance, depending upon the level of IT integration and organizational structure achieved. More specifically, these studies suggest that performance improvements should be more readily observed among highly integrated mature organizations who have successfully achieved strategic fit.

IDS Quality Outcomes

IDS quality outcomes are defined as intangible, quality-related measures of organizational service and performance (Li and Collier, 1999; Devaraj and Kohli, 2000). Quality outcomes are of particular concern to IDSs due to the need for healthcare

entities and networks to continually improve the quality of patient care (Snyder and Paulson, 2002). Research suggests measures such as mortality rate, patient satisfaction, average length of hospital stay (ALOS), and other similar patient-centered measures as appropriate quality performance outcomes for the healthcare IDS (Dowling, 1997; Devaraj and Kohli, 2000; Smith and Swinehart, 2001).

In the current study, we adopt ALOS as a measure of quality for the healthcare IDS. Used frequently in the past as a measure of hospital and IDS quality, initial formation and growth of IDSs in the early to mid-1990's resulted in reductions in ALOS. For instance, Kim (2000) examined the impact of IDS formation on ALOS in the 1990's and found that ALOS was shorter for those IDSs who had achieved a high degree of functional process integration across all IDS participants. The author determined that those IDSs who had successfully shortened ALOS had done so through the streamlining of patient care with expanded services and through reductions in the time associated with administrative tasks. However, contrary to Kim's (2000) findings, more recent studies seem to indicate that these reductions may have slowed or stalled over the past few years (Page, 2003), suggesting that perhaps the formation of an IDS alone is not enough to ensure long-term quality improvements.

Regarding the role of IT in healthcare performance improvements, Li and Collier (2000) investigated the impact of IT on hospital performance through a survey of hospital administrators. The results of their study indicated that IT had a significant positive impact on improvements to both the hospital's quality and financial performance through IT's perceived ability to enhance accuracy, timeliness, and effectiveness of patient care. Extending these findings, research suggests that as IT resources increase in complexity and sophistication, organizations face increasing pressure to pursue further business transformation in an effort to improve coordination and integration. Thus, as IDSs mature, IT's role seems to evolve from that of business process support to enabler of business transformation (Schumaker, 2002). Similarly, as IDSs expand, increasing differentiation of services often results, thereby forcing these networks to reevaluate and improve both organizational and IT integration to maintain a streamlined continuum of patient care (Schumaker, 2002).

Turning to the literature on strategic fit, support exists for the suggestion that strategic fit seems to have a more significant impact on financial and quality performance among interorganizational networks with high levels of IT integration and organizational maturity than among those with lower levels of IT integration and organizational maturity (Sabherwal and Chan, 2001; Smith and Swinehart, 2001). For instance, in their study of defenders, prospectors, and analyzers, Sabherwal and Chan (2001) identified IT strategy profiles appropriate for these different levels of organizational structure. In turn, these researchers empirically tested and found support for a greater degree of business performance improvement among the more mature organizations with a focus on innovation and flexibility as opposed to immature organizations with an operational efficiency focus.

Extending the firm level findings and theories to the interorganizational network level of analysis, we propose the following hypothesis:

H1: The relationship between strategic fit and average length of hospital stay will be significantly more negative in high integration aligned IDSs than in low integration aligned IDSs.

Financial Performance

The current study uses operational cost as a measure of IDS financial performance. Use of this measure in the context of healthcare satisfies two conditions. First, by exploring the impact of strategic fit on reduction of operational cost, the sample selected may include both for-profit and not-for-profit IDSs, as both are concerned with reducing costs despite their differences regarding profit-centered measures. Second, the healthcare industry in particular is facing increasing pressure to reduce costs while continuing to improve patient care quality (Snyder and Paulson, 2002); thus, it is important to examine the potential impact of strategic fit on cost measures. The very formation of healthcare IDSs represents one attempt to control costs through the anticipated streamlining and improvement of the patient care continuum. Yet, the performance of IDSs has not historically supported this aim. Possibly due to the organizational complexity associated with newly formed healthcare networks, researchers suggest that organizational changes alone may be insufficient to bring about financial performance improvements for the IDS (Coddington and Moore, 2001).

In recent years, IDSs have begun to look more closely at the benefits of IT integration in hopes of improving operational cost (Etchen and Boulton, 2000). Prior evidence suggests that IT may have a significant influence on the reduction of operational costs through improved efficiency and effectiveness (Barua, Kriebel and Mukhopadhyay, 1995; Coddington and Moore, 2001; Byrd et al., 2005). For instance, a case study of 11 healthcare IDSs looked at steps taken to potentially reduce operational costs. In addition to the formation of the IDS and the streamlining of patient care within the IDS, all 11 stated that automation of clinical and administration processes through IT had resulted in significant operational cost reductions (Coddington and Moore, 2001).

Building upon these past results, Barua et al (1995) and Byrd et al (2005) also demonstrated support for the indirect cost benefits of IT associated with quality outcome improvements. The premise behind these studies was that often the quality benefits of IT may be realized first and should, in turn, lead to financial performance improvements over time. Extending the firm-level evidence presented above to the interorganizational network level of analysis, we propose the following hypotheses:

H2: The relationship between strategic fit and operational cost will be significantly more negative in high integration aligned IDSs than in low integration aligned IDSs.

H3: The relationship between average length of hospital stay and operational cost will be significantly more negative in high integration aligned IDSs than in low integration aligned IDSs.

METHOD

Sample

Using the 2004 HIMSS Analytics Database, IDSs were evaluated for strategic alignment. Of those determined to have achieved strategic alignment, the IDSs were classified as high integration aligned or low integration aligned. From each of these categories, 65 IDSs were randomly selected, for a total sample size of 130. These IDSs represent a broad spectrum of diversity, size, geographic reach, and comprehensiveness of patient care. The IDS classification process is described in greater detail in the next section.

IDS Classification

Profile matching (Chan, et al., 1997) was used to identify those IDSs aligned with high IT integration/sophistication and organizational maturity and those aligned with low IT integration/sophistication and organizational maturity. Profile matching assigns a score to both the IT profile and the organizational profile of the entity. Then, if the two scores are equal or close within a very small, pre-determined range, the organization is deemed to have achieved strategic fit; otherwise the organization is deemed to lack strategic fit. Profile matching can also be extended to indicate the level of both IT integration and organizational maturity within the firm by using higher numbers for higher levels of integration or maturity (Chan, et al., 1997). The current study applied profile matching to determine both those who had achieved strategic fit and those who were aligned with a high degree of integration and maturity. To accomplish our classification, we used selected variables from the HIMSS Analytics Database (Table 1). IT integration/sophistication was reflected in IT diversity, as calculated by the number of distinct enterprise systems in use by the IDS; the total number of enterprise applications in use; the number of active network nodes; the percent of employees with internet connectivity; and the number of personal computers. Organizational maturity was reflected in the age of the IDS in years; the size of the population served by the IDS; the number of hospital beds provided by the IDS; the number of full-time IDS employees; the total number of IDS facilities; and the diversity of the services offered, as calculated by the number of different types of entities participating in the IDS.

Construct	HIMSS Analytics Variables for the IDS
IT Integration and Sophistication	Total number of enterprise applications currently in use by the IDS Number of different types of enterprise applications (i.e. ERP, Clinical Decision Support, Case Mix Analysis) Number of available network nodes Number of personal computers currently in use by the IDS Percentage of IDS desktops with internet access
Organizational Maturity	Number of facilities Number of different types of facilities (i.e. acute care, home healthcare, physician organization, insurer) Age (in years) of the IDS Number of hospital beds currently staffed Number of full-time IDS employees Service population

Table 1. Variables for IDS Classification.

Each variable was standardized using z scores; and a six-point rating scale was developed, ranging from 1 (extremely low with a z score between -2 to -3) to 6 (extremely high with a z score between 2 to 3) (Figure 2). Each IT integration/sophistication attribute was rated with the ratings averaged to form an overall IT integration/sophistication rating; the same was done for organizational maturity. When both the IT integration/sophistication and organizational maturity ratings were high (or low), the lower of the two ratings was then recorded as the overall strategic fit rating for the IDS. Otherwise, the IDS was determined to lack strategic fit and was eliminated. Those scoring an overall rating of 4 or above were labeled High Integration Aligned; those with an overall score of 3 or below were labeled Low Integration Aligned. Descriptive statistics of the sample and the associated ratings are provided in Table 2.

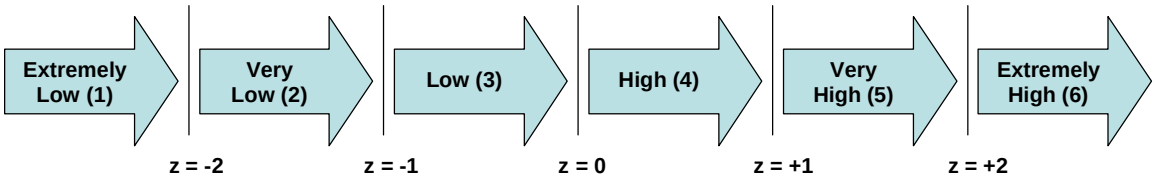

Figure 2. IT Integration/Sophistication and Organizational Maturity Rating Scale.

Criteria	High Integration Aligned IDS Rating N=65		Low Integration Aligned IDS Rating N=65	
	Mean	**SD**	**Mean**	**SD**
Total Number of Enterprise Applications *(Mean=20.57, SD=23.26, Median=13)*	4.78	1.04	3.20	0.44
Number of Different Enterprise Apps *(Mean=6.60, SD=0.70, Median=7)*	3.94	0.24	3.40	1.04
Number of Available Network Nodes *(Mean=1744.35, SD=2460.84, Median=905)*	4.89	0.87	3.28	0.52
Number of PCs Currently in Use *(Mean=1272.42, SD=1809.48, Median=600)*	4.98	0.93	3.22	0.41
Percentage of Personnel with Internet Access *(Mean=76.85%, SD=26%, Median=90%)*	3.75	0.66	3.35	0.89
Overall IT Integration and Sophistication	4.47	0.38	3.29	0.35
Number of Currently Active Facilities *(Mean=14.92, SD=17.24, Median=10)*	4.78	0.91	3.15	0.40
Diversity of Active Facilities/Services *(Mean=3.72, SD=1.02, Median=4)*	4.72	0.91	3.72	0.93
IDS Age in Years *(Mean=56.79, SD=38.22, Median=52)*	2.94	1.04	3.66	1.05
Hospital Bed Capacity *(Mean=431.63, SD=490.38, Median=269)*	5.28	0.78	3.28	0.48
Number of Full-Time IDS Employees *(Mean=2256.95, SD=2903.53, Median=1300)*	5.22	0.80	3.26	0.44
Size of the Population Served by IDS *(Mean=1157848.28, SD=9172584.12, Median=270000)*	3.72	0.57	3.23	0.42
Overall Organizational Maturity	4.44	0.30	3.38	0.23
Overall Strategic Fit Rating	4.06	0.24	2.97	0.17

***Descriptives for sample are in italics.**

Table 2. Descriptive Statistics and IDS Rating.

Measurement

The measurement model was a second order model in which IT integration/sophistication and organizational maturity were first-order factors that comprise strategic fit as a second-order factor. IT integration/sophistication and organizational maturity were reflective constructs measured using the same factors employed in the IDS classification process, as extracted from the 2004 HIMSS Analytics Database (Table 1). The dependent variables, ALOS and operational cost, were measured using data from the 2004 American Hospital Directory.

RESULTS

Data analyses were conducted in two parts. First, using the full sample of 130 IDSs, confirmatory factor analysis was conducted for the IT Integration/Sophistication and Organizational Maturity constructs. All goodness of fit indices indicated acceptable fit for each construct (Table 3).

Measurement	Range of Standardized Factor Loadings	NFI	IFI	CFI	RMSEA	CMIN/DF
Organizational Maturity	0.39-0.96	0.971	0.98	0.979	0.131	3.211
IT Integration and Sophistication	0.28-0.99	0.978	0.991	0.991	0.072	1.663

NFI, normed fit index; IFI, incremental fit index; RMSEA, root mean square error of approximation.

Table 3. Confirmatory Factor Analysis.

PLS was used for model analysis (Sambamurthy and Chin, 1994; Byrd et al, 2005). T-tests were performed to assess the significance of any differences between the path coefficients of the two samples. Because our hypotheses suggested a stronger relationship for highly integrated aligned IDSs, one-tail significance levels were used (Hair et al, 1998). The test results are presented in Table 4, and the measurement models are presented in Figures 3 and 4.

	Path Coefficient		
Hypothesis	High Integration Aligned IDSs	Low Integration Aligned IDSs	t-Statistic for Difference
H1: Strategic Fit to ALOS *(Supported)*	-0.158**	0.043	
H2: Strategic Fit to Operational Cost *(Supported)*	0.812***	0.905***	1.63*
H3: ALOS to Operational Cost *(Supported)*	-0.074**	0.019	

*p<.10.
**p<.05.
***p<.01.

Table 4. Hypotheses Test Results.

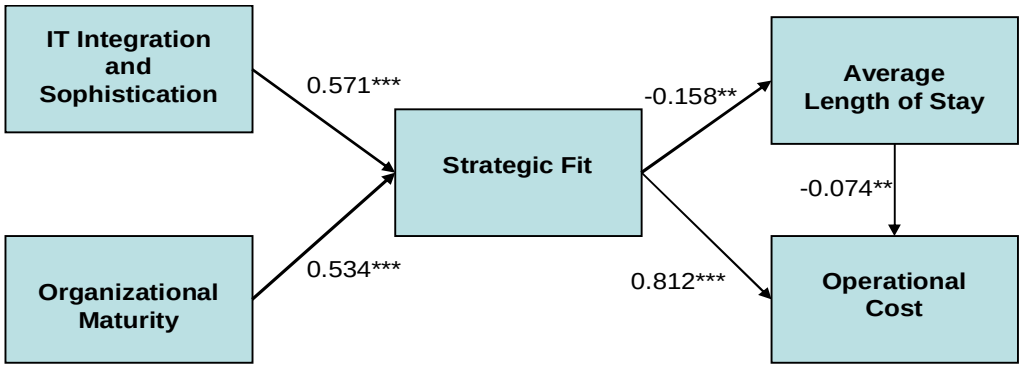

Figure 3. Strategic Fit Model for High Integration Aligned IDSs.

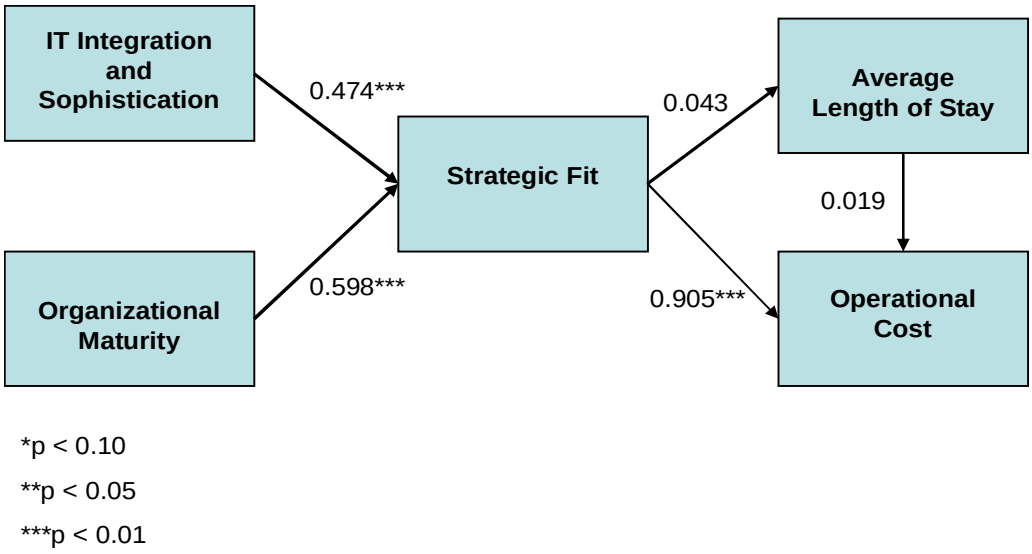

Figure 4. Strategic Fit Model for Low Integration Aligned IDSs.

Hypothesis 1 was supported. High Integration Aligned IDSs demonstrated a significant negative relationship between Strategic Fit and ALOS, while Low Integration Aligned IDSs demonstrated a positive relationship between Strategic Fit and ALOS. Hypothesis 2 was supported. Although neither sample demonstrated a negative link between strategic fit and operational cost, High Integration Aligned IDSs did demonstrate a weaker positive relationship than did Low Integration Aligned IDSs. Finally, hypothesis 3 was supported. High Integration Aligned IDSs demonstrated a significant negative relationship between ALOS and Operational Cost; but, Low Integration Aligned IDSs demonstrated an insignificant positive relationship.

DISCUSSION

The current study has demonstrated empirical support for a difference in the impact of strategic fit across two levels of interorganizational network development. The proposed model examined the relationship between strategic fit and both quality and financial performance outcomes at the interorganizational network level of analysis, a rare perspective in the IT literature.

Hypothesis 1 was supported, suggesting that IDSs who have achieved strategic fit with a higher level of IT integration/sophistication and organizational maturity should see a reduced ALOS. On the contrary, ALOS may be increased when IDSs achieve strategic fit at a lower level of IT integration/sophistication and organizational maturity. Researchers attribute increased efficiency and effectiveness and improved knowledge sharing to high levels of IT integration and effective business processes. Perhaps it is these benefits that contribute to the improvements in ALOS seen in High Integration Aligned IDSs. As Kim (2000) and Li and Collier (2000) noted, strategic fit and higher levels of IT and organizational integration may contribute to improvements in administrative processes and the effectiveness of clinical care, thereby resulting in shortened ALOS.

Hypothesis 2 was supported. Although the relationship between strategic fit and operational cost was positive for both groups, the relationship was significantly weaker for High Integration Aligned IDSs. Thus, these results suggest that the impact to operational cost may be improved in IDSs who have obtained a higher level of IT integration/sophistication coupled with an appropriate level of organizational maturity. Past research suggests that often the financial benefits of IT and strategic fit may not be readily apparent for a few years beyond the initial changes and investments. Thus, future research should consider the inclusion of two to three years of operational cost data to better address the time lag issues of IT investments (Byrd et al., 2005; Barua et al., 1995).

Hypothesis 3 was supported, suggesting that IDSs who have achieved strategic fit with a higher level of IT integration/sophistication and organizational maturity should see an indirect reduction in operational cost through reduced ALOS. High Integration Aligned IDSs demonstrated a significant negative relationship between ALOS and operational cost. However, Low Integration Aligned IDSs demonstrated no significant link between ALOS and operational cost. Thus, the results seem to suggest possible mediation between strategic fit and reduced operational cost through reductions in ALOS, particularly in High Integration Aligned IDSs. This is in line with previous IT research which has suggested that the financial benefits of IT are often realized indirectly through improvements to quality outcomes (Byrd et al., 2005; Barua et al., 1995).

Implications for Practitioners

Prior IDS performance is cause for concern among IDS administrators and network participants (Parker et al, 2001). Many IDSs are hesitant to make additional expensive investments in IT given the pressures to control costs. However, as the current study has demonstrated, those IDSs who have achieved strategic fit with a high level of IT integration/sophistication and a mature organizational structure have demonstrated improved performance in terms of reduced ALOS and reduced operational costs. Perhaps the results of the current study may lend support and justification to a continued emphasis on IDS expansion and increased IT integration in support of the goals of the IDS.

Regarding the direct impact to operational cost, the results of the current study suggest that those IDSs who have achieved a higher level of IT integration/sophistication and organizational maturity are beginning to see operational cost improvements. The push for IDS formation and IT integration is still a relatively young concept in the healthcare industry; therefore, it is probable that those who have reached the level of High Integration Aligned have done so only in recent years. Thus, the time lag effect of IT investment would suggest that direct effects on operational cost may not yet be fully realized.

Considerations for Future Research

Common across most industries are the performance goals of higher quality and reduced costs. As organizations in many industries begin to, or continue to, pursue the establishment of interorganizational networks, the current study provides a good initial exploration of the benefits of strategic fit in these arrangements, particularly in interorganizational networks with high levels of IT integration and sophistication, coupled with a mature well-developed organizational structure. In addition, the current study serves to highlight the added complexities encountered as we move IT research to the interorganizational network level. Thus, further exploration of the proposed model and hypotheses is needed across other industries and in varying contexts to aid in further refinement of the model, to examine a broader spectrum of interorganizational arrangements, and to lend to the generalizability of the current study's findings. We suggest that the results of the current study should serve as a foundation upon which to build a research agenda around the interorganizational network, a level of analysis in need of focused research attention.

CONCLUSION

Interorganizational networks come in a variety of forms, sizes, strategic arrangements, and ownership structures. The current study used the IDS, an interorganizational network arrangement prevalent in the healthcare industry, to empirically test a model of strategic fit across two different levels of network development. In doing so, the results seem to suggest that a

difference exists regarding the benefits of strategic fit at different levels of organizational development. In addition, the results of the study serve to further illuminate the complexities associated with taking IT research to the interorganizational network level of analysis. Even within a single industry, tremendous variation may be present regarding the form, structure, goals, and management of these networks. This variation may increase the difficulty of empirical studies of IT value for the interorganizational network. Yet, on the other hand, this level of analysis brings with it the potential for a very rich body of knowledge around the issues of complexity, interorganizational structure, variance of scope and strategy, and other similar phenomena. Thus, in the current study, we begin to lay the groundwork for a research agenda centered around the complexities and nuances of the interorganizational network, an area of focus lacking in the IT literature.

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