EXAMINING STRATEGIC FIT FOR THE INTERORGANIZATIONAL NETWORK:

AN EMPIRICAL INVESTIGATION OF THE HEALTH CARE INTEGRATED

DELIVERY SYSTEM

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EXAMINING STRATEGIC FIT FOR THE INTERORGANIZATIONAL NETWORK: AN EMPIRICAL INVESTIGATION OF THE HEALTH CARE INTEGRATED DELIVERY SYSTEM

Evelyn Holmes Thrasher

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Date of Graduation

DISSERTATION ABSTRACT

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In response to the calls for IT research at the interorganizational network level of analysis, this study examined the phenomenon of strategic fit at this level. Health care integrated delivery systems (IDS) were chosen as distinct and useful examples of interorganizational networks. IDSs may take a number of organizational forms, namely strategic alliances, contracted networks, or joint ventures and, in many cases, may be made up of multiple forms within a single network. The multiplicity of organizational structures and the variance in the levels of IT integration and sophistication across different IDSs make the IDS a good source of investigation regarding interorganizational networks. As such, this study empirically tested a model of strategic fit for the interorganizational network. In particular, the influence of strategic fit between IT

integration and sophistication and interorganizational integration on both quality and financial performance was examined. Further, the study made comparisons across two groups of IDSs, mature and immature, to quantify the potential differences in the nature and strength of the strategic fit to performance relationship across two distinct levels of IDS maturity.

The study employed primary survey data and secondary data obtained from HIMSS Analytics and the American Hospital Directory for 75 health care IDSs currently active in the United States. Empirical testing was conducted using PLS-Graph, and multigroup comparisons were made using t-tests. This study produced mixed, but favorable, results. The classification process produced evidence of strategic fit among health care IDSs. The findings of the empirical model illuminated the need for greater IT integration, interorganizational integration, and the strategic alignment of the two if IDSs are to be successful.

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To my mother, Dorothy Holmes, and my father, the late George Holmes, thank you for teaching me to work hard and to reach for my goals, no matter how far away they may seem. And, finally, to our Father in Heaven, you taught me that "with God, all things are possible". Thank you for walking with me on this amazing journey.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

For decades information technology (IT) has played an increasingly significant role in firm operations across virtually ever industry. Firms worldwide look to their IT resources to enhance performance in a number of ways, such as operational efficiency, business process automation, financial indicators, and other similar improvements (Kuwaiti & Kay, 2000). Over time, the nature of IT's role in the firm has expanded and evolved from a backoffice support system to a critical strategic resource and source of competitive advantage (Venkatraman, 1994). "Information and IT have become the fifth major resource available to executives for shaping an organization (Rockart, Earl, & Ross, 1996, p. 53)", joining the more traditional resources of people, equipment, raw materials, and capital. At each stage of IT's evolution, CIOs and CEOs have struggled to identify and quantify the role of IT and the tangible benefits of IT for the firm (Rockart et al., 1996). With increasing rapidity, the pressures to perform better, faster, and cheaper than the competition are forcing firms to continually investigate new and different organizational structures, as well as, more innovative ways to use their IT resources in support of these new structures.

With the growing complexity of the firm's IT resources and the diffusion of IT throughout most functions of the firm, quantifying IT business value has also become

progressively more critical and more difficult. In fact, firms in the 1980's and early 1990's, a time when the anticipated performance benefits from IT investments did not seem to materialize, witnessed the productivity paradox of IT (Brynjolfsson & Hitt, 1996). Firms were managing large IT budgets with no clear evidence of payoff. Since the mid-1990's, research has more consistently demonstrated a positive relationship between IT and improved firm performance, thus, negating the productivity paradox and lending support to a continued emphasis on IT integration and innovation across all industries (Brynjolfsson & Hitt, 1996).

More recently, firms have discovered the potential for even greater performance benefits when the firm's IT and business strategies are closely aligned. Organizations struggle with the achievement and maintenance of strategic fit, which refers to the alignment of organizational goals and structure with appropriate IT resources and integration (Rockart et al., 1996). Firms today realize that in a volatile and highly competitive environment where IT is more heavily diffused into most organizations, simply obtaining and using IT resources may be insufficient to realize significant performance improvements and competitive advantage. Instead, most expect to gain greater benefits when the goals and strategies for IT are more closely aligned with the business strategy and structure of the firm and vice versa (Chan & Huff, 1993; Rockart et al., 1996). As Ross, Beath, and Goodhue (1996) point out, effective IT-business relationships are a major source of benefit to the firm when managed and maintained successfully. Thus, a relatively new stream of IT research developed since the mid-1990's around the attainment, identification, and measurement of strategic fit as a critical

means of performance improvement (Henderson & Venkatraman, 1993; Chan & Huff, 1993; Venkatraman, 1994; Chan, Huff, Barclay, & Copeland, 1997; Dowling, 1997).

In addition to the alignment of IT and business strategies within a single firm, the contemporary business environment requires that firms look to expanded and innovative organizational structures and strategies for competitive advantage. Labeled the "era of the integrated enterprise" (Waring & Wainwright, 2000), strategic alliances in the form of interorganizational networks continue to receive attention in both service and manufacturing industries as a new and potentially valuable means of achieving performance improvement and competitive advantage (Payton & Ginzberg, 2001; Lapiedra, Smithson, Alegre, & Chiva, 2004; Straub, Rai, & Klein, 2004). Interorganizational networks have been defined as "clusters of organizations that make decisions jointly and integrate their efforts to produce a product or service (Alter & Hage, 1993)." Expanding this definition to include the primary goals of these networks, others have defined interorganizational networks 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)." Key to both of these definitions is the emphasis on integration, innovation, and common business strategy, issues that have been, and continue to be, of great concern to both practitioners and researchers alike (Simoens & Scott, 2005). Researchers also suggest that the strategic fit between IT and the rest of the business operations plays a more critical role in the success of these interorganizational network arrangements than it does in individual firms (Straub et al., 2004).

The phenomenon of strategic fit has been investigated in some detail at the firm level of analysis, and researchers emphasize the importance of attaining strategic fit to more fully realize the potential of IT (Henderson & Venkatraman, 1993; Chan & Huff, 1993; Venkatraman, 1994; Chan et al., 1997; Dowling, 1997). However, the IT literature is void with examples of a linkage between strategic fit and IT value to performance at the interorganizational network level of analysis (Straub et al., 2004; Simoens & Scott, 2005). Though interorganizational network arrangements continue to gain attention as viable business structures, empirical evidence of the value of IT at the network level is also lacking. As firms enter into and expand interorganizational network arrangements, they experience greater complexity of structure, form, governance, and strategy. Consequently, the achievement of strategic fit comes to the forefront of issues faced by the network's management team, as they must work to integrate the IT and business resources of multiple, autonomous organizations into a single, seamless, efficient network. As a result, these newly formed interorganizational networks often have difficulty quantifying the business value of the network's IT resources, which some would argue are the most critical enabling resources in the successful formation of interorganizational networks (Payton & Ginzberg, 2001; Melville, Kraemer, & Gurbaxani, 2004; Straub et al., 2004).

Strategic fit for the interorganizational network is clearly a new area of investigation and an area in need of focused research attention. This research provides a model of strategic fit for the interorganizational network and examines the relationship between strategic fit and both quality and financial performance improvements. In addition, using integrated delivery systems within the health care industry, the present

research empirically examines potential differences in the nature and intensity of these relationships across different levels of interorganizational network development.

Theoretical Foundation and Definitions

To more fully discuss the model developed for this research, it is first necessary to examine the theoretical foundations upon which the model is built. Three important theories and research streams inform the model and the present research; these are strategic fit, IT integration, and interorganizational integration. Each of these is defined in the sections that follow.

IT Integration

Waring and Wainwright (2000, p. 137) define integration as "a result or an effect of correct commonality." Extending correct commonality to IT, IT integration may be defined as seamless, boundariless, access to information from anywhere anytime (Knoedlier, 2003). Integration implies interconnectedness and allows for the sharing of information across both functional and geographic boundaries with minimal effort on the part of the end user (Waring & Wainwright, 2000). Successful IT integration will deliver IT resources that support the new roles and functions of workers as a result of redesigned and more tightly integrated business processes (Rockart et al., 1996). Furthermore, IT integration extends to all facets of the IT infrastructure, including telecommunications, hardware, software, and data. Contemporary firms look to IT integration as a means of not only improving and automating existing processes, but also as a way to spur business process change and improvement (Bhatt, 2000). Some researchers argue that IT integration is essential, though difficult to achieve, for the establishment of successful interorganizational networks (Weiner, Savitz, Bernard, & Pucci, 2004; Simoens & Scott,

2005). Past research also suggests that organizations should realize greater performance benefits as the organization's IT resources, management, and support services are increasingly integrated (Weiner et al., 2004; Simeons & Scott, 2005).

Interorganizational Integration

Organizational integration is a means to "achieve the business mission and objectives in a harmonious way (Waring & Wainwright, 2000, p. 138)." Kuwaiti and Kay (2000) define the integrated organization as one in which the level of consistency and collaboration among the actions of department managers contributes to significant performance improvements. Integration of functions, processes, and skills is critical for the successful evolution of a coherent system within the organization (Kuwaiti & Kay, 2000). As such, the anticipated outcomes of an integrated organization are flexibility, reduced costs, and expedited delivery of products or services (Bhatt, 2000; Lapiedra et al., 2004).

Extending these definitions and goals to the network level, interorganizational networks may be of many different structures and arrangements, even within a single network. Comprised of a number of independent organizations joined together for a common purpose or goal, interorganizational network arrangements may be in the form of contract arrangements, strategic alliances, partnerships, or joint ventures. In general, these arrangements are established to promote collaboration and cooperation across a number of previously autonomous organizations (Borys & Jemison, 1989; Oliver, 1990; Simeons & Scott, 2005). This collaboration and cooperation brings together various distinct core competencies that are then complemented and enhanced by the strengths of the other participants (Lapiedra et al., 2004). And, these relationships are not limited by

organizational size, industry type, or geographic boundaries (Alter & Hage, 1993). As such, with this variety of structure and form also comes diversity and complexity in the level of organizational and business process integration that exists among the network participants (Weiner et al., 2004; Simeons & Scott, 2005). The current research labels this phenomenon "interorganizational integration" and emphasizes the tremendous complexity of integrating structures, functions, and business processes at the interorganizational network level.

In terms of achieving integration at the interorganizational network level, research suggests that "these clusters of organizations who make decisions jointly and integrate their efforts to produce a product or service adjust more rapidly to changing technologies and market conditions, develop new products and services in a shorter time period, and provide more creative solutions in the process (Alter & Hage, 1993, p. 2)." And, with greater integration and interorganizational network expansion should come additional quality and financial performance improvements beyond that of less integrated networks (Schumaker, 2002; Weiner et al., 2004).

Strategic Fit

Since the early 1990's, researchers have recognized and emphasized the idea that IT integration or organizational change conducted in isolation is insufficient to bring about significant long term performance improvements. Instead, firms must consider the goals and strategies of the organization and its IT resources in tandem to more fully realize the benefits obtained from these changes. In fact, Henderson & Venkatraman (1993) attribute the productivity paradox of the 1980's and early 1990's to the

misalignment of business and IT strategies and the neglect of firms to recognize the importance of this alignment.

Termed "strategic fit", this concept is simply defined as "the fit between business and IT strategy (Chan & Huff, 1993, p. 345)." Expanding this definition, strategic fit is a process of adaptation in which organizational changes must be supported by complimentary IT resources and integration (Henderson & Venkatraman, 1993; Kuwaiti & Kay, 2000). Key to the expanded definition is "process", which addresses the dynamic nature of strategic fit and the necessity of the firm to make continual efforts to achieve and maintain strategic fit at every stage of organizational evolution. Henderson and Venkatraman (1993) suggest that strategic fit is complicated to achieve. Yet, researchers argue that strategic fit is necessary for enhanced long-term performance improvement (Chan & Huff, 1993; Rockart et al., 1996; Chan et al., 1997). Past research suggests that IT's evolution to a critical strategic resource brings with it an ability to not only support organizational change but to enable and encourage it (Venkatraman, 1994; Narasimhan & Kim, 2001; Weiner et al., 2004). Today firms should look to IT as a means of generating organizational and business process change.

Contribution to the Field

While research on strategic fit and IT value at the firm level of analysis is relatively well-established in the IT literature (Henderson & Venkatraman, 1993; Chan & Huff, 1993; Venkatraman, 1994; Chan et al., 1997), the pressures of today's changing economy have forced firms in virtually every industry to consider interorganizational networks as new and innovative strategic arrangements (Dowling, 1997; Kim, 2000; Straub et al., 2004; Weiner et al., 2004). These interorganizational networks bring with

them increased variety of structure, complexity of strategy and governance, complexity of IT resources, and a critical need for strategic fit between the business and IT strategies among the network participants. And, these arrangements have developed at a rapid rate across most industries. For example, the health care industry alone has over 450 interorganizational networks currently active in the US, and this number is growing (HIMSS, 2004). Yet, empirical evidence of the value of strategic fit for interorganizational networks is lacking in the IT literature (Melville et al., 2004; Straub et al., 2004).

As a result, it is necessary to develop a focused research agenda around interorganizational networks and the value of IT and strategic fit for these networks. The present research, therefore, forms its foundation across three research streams: strategic fit, IT integration, and organizational integration. Each of these is well-researched and well-established at the firm level of analysis but needs to be extended to the interorganizational network level. In addition, this study extends the research on strategic fit by examining the possible differences in the relationship between strategic fit and quality and financial performance across different levels of interorganizational network development.

A Conceptual Framework

Adapted and extended from the theoretical and empirical models of Chan et al., (1997) and others (Henderson & Venkatraman, 1993; Chan & Huff, 1993; Venkatraman, 1994; Weiner et al., 2004), the conceptual model for this dissertation is presented in Figure 1. This model captures the constructs of IT integration and interorganizational integration, both individually and as components of a third construct, strategic fit. In

turn, the model hypothesizes significant positive relationships between each of these constructs and both quality and financial performance improvements for the interorganizational network. Finally, also of interest to this research is a comparison of the nature and strength of each hypothesized relationship across different levels of interorganizational network development. This model, its foundational theories, and relevant IT research are explored in greater detail in Chapter 2. It is this model, and the supporting literature, that establishes the foundation for the research questions presented in the following section.

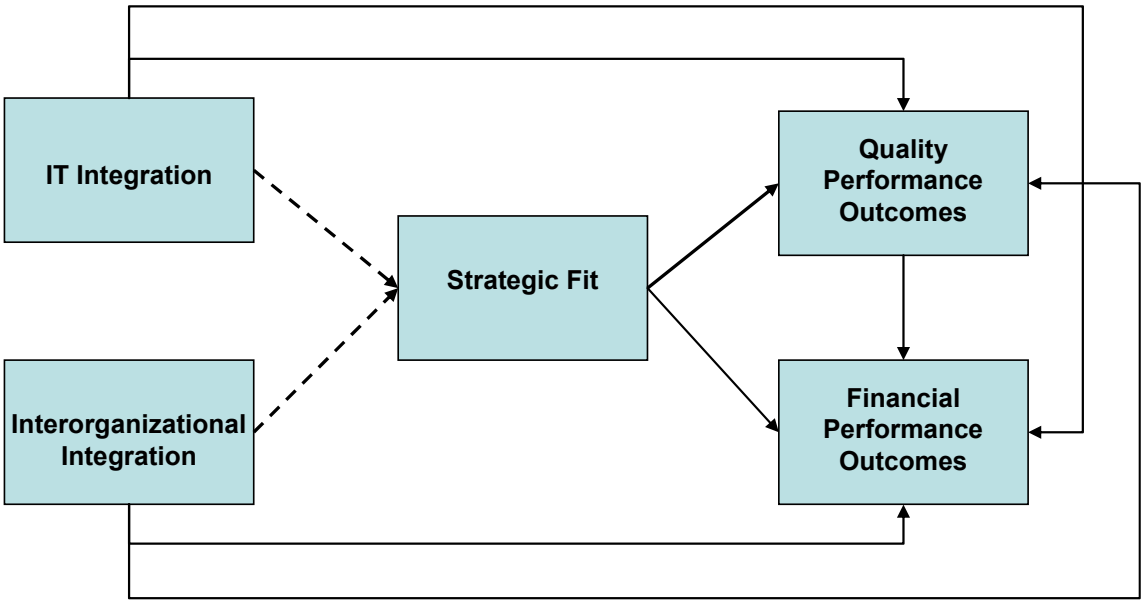

Figure 1. Conceptual model of strategic fit value for the interorganizational network.

Research Objectives and Plan

The present research provides an empirical investigation into the phenomenon of strategic fit at the interorganizational network level of analysis. In doing so, the study also examines IT integration and interorganizational integration as components of

strategic fit appropriate for the interorganizational network. Finally, this work examines possible differences in the nature and strength of the relationships between each of the independent variables and quality and financial performance across different levels of interorganizational network maturity.

Purpose of study and research questions. The purpose of this research is to empirically test a model of strategic fit for the interorganizational network. Further, this dissertation will investigate strategic fit, IT integration and sophistication, and interorganizational integration as each relates to both quality and financial performance. The results of the model will be compared to empirically examine possible differences in the nature and strength of these three factors at different levels of interorganizational network maturity.

The overarching research questions posed and investigated in this study are as follows:

1. Does IT integration and sophistication influence quality performance at the interorganizational network level of analysis?
2. Does IT integration and sophistication influence financial performance at the interorganizational network level of analysis?
3. Does interorganizational integration influence quality performance at the interorganizational network level of analysis?
4. Does interorganizational integration influence financial performance at the interorganizational network level of analysis?
5. Does strategic fit influence quality performance at the interorganizational network level of analysis?

6. Does strategic fit influence financial performance at the interorganizational network level of analysis?
7. Does the nature and strength of the relationships described in research questions 1 through 6 differ across different levels of IT integration and interorganizational maturity?

Methodology. The health care integrated delivery system (IDS) provides a distinct and valuable example of interorganizational networks and is, therefore, chosen as the sample of interest for this dissertation. Comprised of a number of different stakeholders and direct providers of patient care, the health care IDS has become the contemporary business model for the health care industry. In addition, IDSs are of various organizational structures and differing levels of integration, diversification, and geographic reach. Thus, the IDS presents a unique opportunity to examine possible differences in the nature and strength of the relationship between strategic fit and both quality and financial performance across distinct levels of interorganizational network maturity.

Data for the study are gathered using both primary and secondary sources. A Likert-scale survey instrument chosen and refined from existing literature on strategic fit is used to gather primary data from IDS CIOs. The primary survey data are supplemented with secondary data from the Healthcare Information Management Systems Society Database (HIMSS Analytics) and the American Hospital Directory. PLS Graph is then used to analyze the data and to test the study's hypotheses, including the cross-group comparisons. Additional details of this methodology are presented and discussed in Chapter 3.

Expected contributions. The expected contributions of this study are three-fold. First, this study adopts a unique perspective in its use of the interorganizational network level of analysis. Although recognized as a new and important organizational strategy across most industries, empirical research at this level of analysis is rare in the IT literature. Second, this study proposes and empirically examines a theoretically supported model of strategic fit appropriate for the interorganizational network. Third, this study offers insight and new knowledge for both IT researchers and practitioners alike through an empirical comparison of the nature and strength of strategic fit's relationship to quality and financial performance across distinct levels of interorganizational network maturity. For IT researchers, this work lays the groundwork for a new area of research focus. For the practitioner, the study provides insight and a much-needed view of the potential performance benefits of continued efforts toward interorganizational network expansion, as well as, the need for strategic fit at each level of interorganizational network maturity.

Organization of the Dissertation

This research is presented in five chapters; the content of each chapter is briefly described in this section.

Chapter I introduced and described the problem under investigation in this research. In addition, the preceding discussion addressed the importance of this study in terms of its contribution to the IT research literature and its implications for practitioners. The research questions were stated, the conceptual model was presented, and the proposed methodology was briefly summarized.

Chapter II provides a theoretical foundation and background for this research through a review of relevant literature. Theoretical support for the proposed model is discussed, and past literature is used to further develop the constructs of the model and to develop the related hypotheses.

Chapter III describes the methodology to be used for the conduct of this research. The sample of interest is described, and the data collection process is discussed.

Chapter IV presents the empirical results of the data analysis and hypotheses testing. Descriptive statistics and test results are described and summarized.

Chapter V provides a discussion of the research results and offers insight into the implications of these results for both future research and practice. The major contributions and limitations of the study are also discussed. The Chapter concludes with a summation of the study and its findings.

CHAPTER II

LITERATURE REVIEW

A need exists to extend the theories and frameworks of the IT discipline upward from the firm to the interorganizational network level of analysis (Melville et al., 2004; Straub et al., 2004). Thus, the present research proposes to empirically test the relationship between strategic fit and both financial and quality performance at the interorganizational network level of analysis. In addition, the present research examines the potential differences in the nature and strength of the strategic fit-business performance relationship across distinct levels of interorganizational network development. As a result, key to the present research is the perspective and the unit of analysis; therefore, a comprehensive definition of interorganizational networks is warranted. In addition, a review of the IT literature on strategic fit is necessary to more effectively develop the conceptual model for the study.

This chapter begins with a detailed definition and illustration of the interorganizational network using the health care integrated delivery system (IDS) as the framework for this study. The chapter also defines the factors of strategic fit to be examined in this research. Finally, the conceptual model and the resulting hypotheses for the present study are developed and discussed.

Interorganizational Networks

The contemporary business environment creates tremendous pressure for firms to align with partners, collaborators, and even competitors, in order to form strategic arrangements known as interorganizational networks. In the "era of the integrated enterprise (Waring & Wainwright, 2000)," these clusters of like-focused organizations are increasingly established within many industries as a form of competitive advantage (Payton & Ginzberg, 2001; Straub et al., 2004). Interorganizational networks are defined as advanced integrated strategic alliances comprised of otherwise autonomous organizations established for a common goal or purpose (Alter & Hage, 1993; Young & McCarthy, 1999; Deluca & Enmark, 2002; Schumaker, 2002).

Interorganizational networks may be viewed as a type of value chain. Value chains are comprised of a combination of demand and supply chains, thereby creating a comprehensive stream of firms for product creation and delivery to the end consumer. This configuration allows for more effective movement of materials, information, and payments along the chain of customers and suppliers and, in turn, results in faster response to changing customer demands (Chan, 2005; Singh, Salam, & Iyer, 2005). Though similar to the value chain concept in terms of improving the efficiency of meeting customer demands, interorganizational networks adapt this concept to include a lateral network of stakeholders, all of whom potentially provide a direct service or product to the customer. To that end, the functions, processes, and governance of the interorganizational network are integrated across organizational boundaries as a means of improving service quality and financial performance, and gaining competitive advantage

(Alter & Hage, 1993; Payton & Ginzberg, 2001; Lapiedra et al., 2004; Straub et al., 2004).

Researchers argue that interorganizational networks have been enabled largely by IT advances and innovations (Al-Mashari & Zairi, 2000; Schumaker, 2002; Straub et al., 2004; Simoens & Scott, 2005). IT enhances the formation and growth of the interorganizational network through its ability to facilitate information flow across organizational boundaries (Al-Mashari & Zairi, 2000). Further, IT has been posited to encourage flexible structural forms and innovative processes such as those demonstrated by interorganizational networks (Hsiao & Ormerod, 1998; Straub et al., 2004).

The creation and evolution of interorganizational networks often results in an additional complexity of structure, form, administration, and function not necessarily present at the firm level (Page, 2003; Straub et al., 2004). These diverse organizational structures, management structures, and business strategies may even be present within a single network (Page, 2003; Melville et al., 2004; Straub et al., 2004). Thus, the present research focuses on the health care IDS as an example of interorganizational networks. The use of a single industry may reduce some of the variation more likely to be observed with an investigation across multiple industries. Yet, the large number of interorganizational networks within the health care industry should still provide a representative sample of diverse arrangements and levels of integration with which to form a basis for future research. The following section describes the health care IDS and illustrates the enabling role of IT in these new business forms.

Overview of Health Care IDS

Health care organizations, like firms in most industries, face significant pressure to provide higher quality service at lower costs. According to Etchen and Boulton (2000), researchers and market analysts in the early 1990's predicted a dramatic increase in the consolidation of health care providers. Much of the consolidation in the health care industry prior to 1990 involved only hospitals and was caused by a decreased demand for inpatient care. However, as demand for alternative services such as outpatient and home health services has increased over time, further consolidation has occurred among a variety of health care entities to provide a diversified, comprehensive continuum of care, known as the IDS (Conrad & Shortell, 1997; Young & McCarthy, 1999; Page, 2003).

IDSs in existence today are of various forms, including contract arrangements, partnerships, strategic alliances, and corporate ownership; and multiple arrangements may be present within a single IDS (Conrad & Shortell, 1997; Page, 2003; Weiner et al., 2004). Comprised of diverse combinations of insurers, hospitals, physician practices, and other medical care organizations, IDSs are arguably enabled through IT capabilities and innovation (Young & McCarthy, 1999).

Traditional health care network structure. The idea of networks in the health care industry is not new. The purpose and nature of work in the health care industry has always required the sharing of information, knowledge, resources, and people. Traditionally, however, this has been accomplished through hybrid arrangements of health care providers, each with different roles, organizational structures, and information needs. Similar to other hybrid arrangements, health care networks have been established to promote high quality patient care and reduced costs (Borys & Jemison, 1988; Oliver,

1990). In the past, the patient has been the hub of the network. Therefore, information exchange has been accomplished primarily through manual processes that forced the patient to relay information numerous times to a number of different organizations. While the risk associated with multiple data entry points is an important issue among firms in most industries, this risk becomes even more crucial in the health care industry where diagnosis and treatment depend upon accurate, timely, comprehensive patient data (Dowling, 1997; Friedman & Wyatt, 1997). To further complicate the issues, at any given point in time a network entity could be both a partner and a stakeholder depending upon the circumstances of the transaction or the nature of the patient service being provided (Friedman & Wyatt, 1997). Figure 2 depicts the traditional health care network as a hub and spoke arrangement linked together by the patient (Rosow & Grimes, 2003).

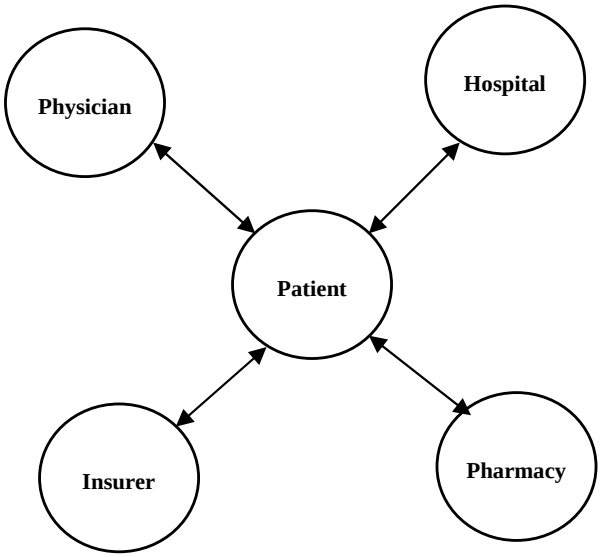

Figure 2. Traditional health care network structure.

IT-enabled health care structure. Researchers suggest that IT has the capability to act as an electronic intermediary, thus, replacing the patient as the hub of the health care network. IT's new role in the health care industry should allow for direct

interorganizational links among all entities of the health care network, regardless of function, purpose, or geographic location (Venkatraman, 1994; Kaplan & Brennan, 2001). Further, as pictured in Figure 3, the electronic intermediary promotes the exchange of information, medical data, and discoveries among a number of combinations of patients, providers, and payers in a timelier, more efficient manner (Venkatraman, 1994; Friedman & Wyatt, 1997; Kaplan & Brennan, 2001; Rosow & Grimes, 2003). Information is still seen as the key driver of the health care industry and serves as the link among the various entities in the network. However, applications such as case mix analysis, decision support, electronic medical records, and enterprise resource planning are making information exchange more consistent and accurate. In addition, these new applications, along with continued IT innovation, are leading to the establishment of logical integrated health care systems with more fluid boundaries and less reliance on the patient (Kaplan & Brennan, 2001; Beaudoin & Bogaert, 2003).

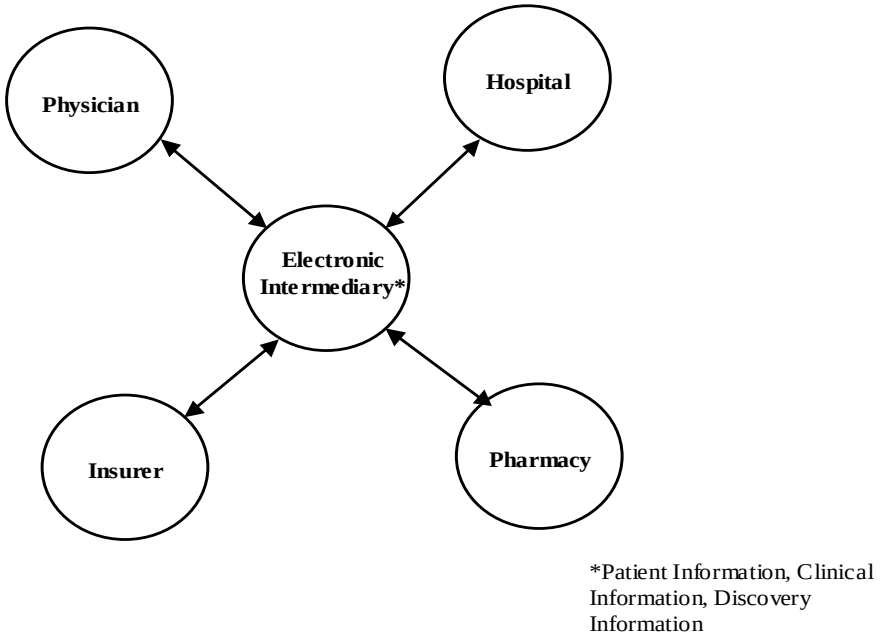

Figure 3. IT-enabled health care structure.

In concert with IT integration, health care organizations may also implement changes to organizational structure, management structure, and interdependence of processes previously carried out by distinct health care organizations. When the result is strategic alignment of IT and business strategies, this alignment seems to increase the overall performance benefits to the organizations above and beyond the benefits realized when IT resources are simply imposed on existing business processes (Henderson & Venkatraman, 1993; Venkatraman, 1994; Chan et al., 1997; Li & Collier, 2000).

Strategic Fit

The 1980's saw a change in attitude among researchers and practitioners regarding the role of IT in an organization (McFarland & McKenney, 1983; Parsons, 1983; King, 1984; Weill, 1990). Prior decades had viewed IT as primarily a backoffice support tool and a means of potentially automating daily operational processes. However, researchers in the 1980's noted IT's ability to enhance the organization's business strategy, thereby, bringing about competitive advantage (McFarland & McKenney, 1983; Parsons, 1983; King, 1984; Weill, 1990). Many firms during that time struggled with an inability to quantify the value of their IT investments; moreover, other firms seemed to find disappointing results when IT investment costs were compared with the perceived benefits. These disparaging results led to what researchers labeled the "productivity paradox" of IT (Brynjolfsson & Hitt, 1996).

It was this paradox that prompted researchers to examine new potential roles for IT and to work toward quantification of how IT could best add value to the organization. Known as strategic fit, researchers conceptualized a symbiotic relationship between IT strategy and business strategy which they felt would result in greater benefits for firms

across many industries (McFarland & McKenney, 1983; Parsons, 1983; King, 1984; Weill, 1990). Yet, with the exception of a few case studies, lacking from this new area of research was solid empirical evidence to support these claims (Clemons & Row, 1988; Copeland & McKenney, 1988).

In the 1990's, researchers began to develop an approach to the investigation of strategic fit between the business goals and IT resources (Jarvenpaa & Ives (as cited in Chan, 1993); Raymond, Pare, & Bergeron, 1990; Chan & Huff, 1993; Chan et al., 1997). During this decade, frameworks such as the Strategic Alignment Model (Henderson & Venkatraman, 1993) were developed and the idea of strategic fit came to the forefront as a relevant stream of IT research. The sections that follow review the IT research on strategic fit most relevant to the current study. Two prominent frameworks which conceptualize strategic fit as a dynamic process rather than a static event are reviewed, followed by a discussion of six measurement perspectives of strategic fit. In addition, the factors of strategic fit selected for the present research are defined and discussed.

Strategic Fit Frameworks

Strategic alignment model. Henderson and Venkatraman (1993) posited that misalignment of business and IT strategies may have caused the lack of quantifiable evidence of IT value in many organizations in the late 1980's and early 1990's. To better illustrate the complex process of business-IT alignment, the authors proposed an extensive framework called the Strategic Alignment Model, as depicted in Figure 4 (Henderson & Venkatraman, 1993). To form the foundation for the model, the authors defined strategic fit as a process of adaptation in which organizational changes must be supported by complementary IT resources and integration. A significant contribution of

this definition is the idea of strategic fit as a process rather than a static event; further, this process may be driven by either the organization's business strategy or IT strategy (Henderson & Venkatraman, 1993).

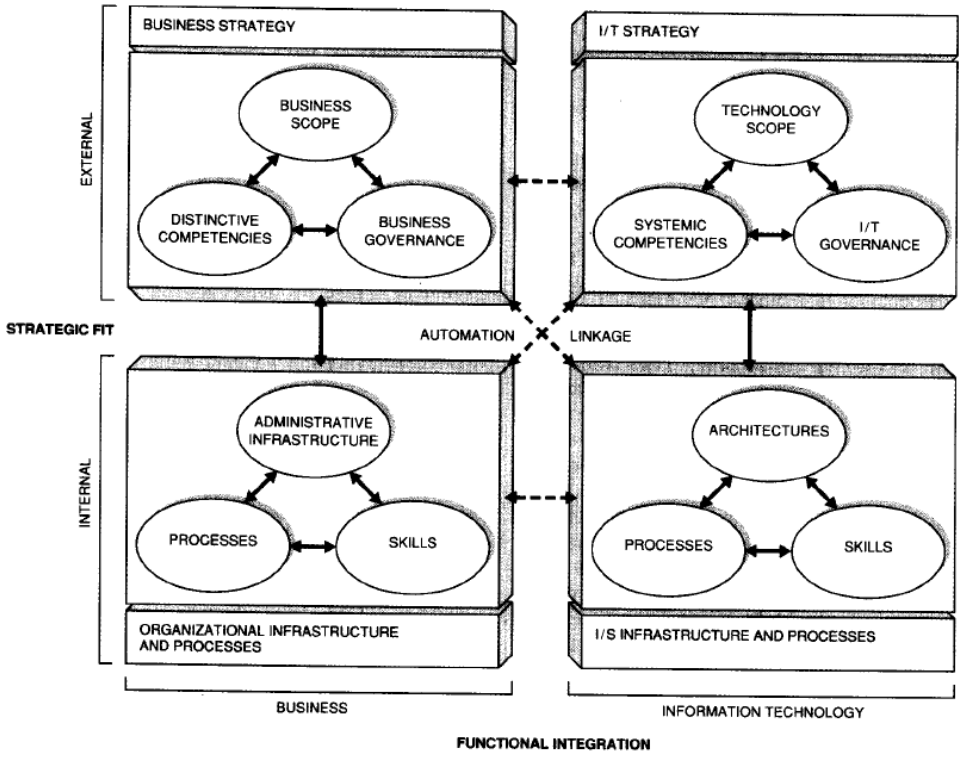

Figure 4. Strategic Alignment Model (Henderson & Venkatraman, 1993).

Strategic fit research prior to the work of Henderson and Venkatraman (1993) tended to ignore external considerations of strategic market positioning and dealt only with the internal role of IT to support the operational functions of the organization. Further, early research also ignored the ability of IT to enable and promote strategic fit for the organization, but rather maintained a view of IT as merely a support resource (Weill, 1990; Das, Zahra, & Warkentin, 1991). Thus, the Strategic Alignment Model made an additional contribution to the literature by expanding upon the internal focus of prior strategic fit research and adding an external dimension. This new dimension

particularly highlighted the enabling potential of IT toward the establishment of position and competitive advantage in the external marketplace (Henderson & Venkatraman, 1993).

IT-enabled business transformation framework. Venkatraman (1994) extended the Strategic Alignment Model with a hierarchical framework of business transformation, further emphasizing the new and important role of IT to promote the transformation of business processes and organizations. Filling a gap in the IT literature, the IT-Enabled Business Transformation Framework (Figure 5) suggests that the role of IT in the organization should shift from that of operational business support and automation to one of more strategic utility in organizational transformation. This new role gains importance as organizations transform upward from the evolutionary and internally-focused levels to the revolutionary and externally-focused levels, such as that of an interorganizational network (Venkatraman, 1994). This framework is defined in Table 1.

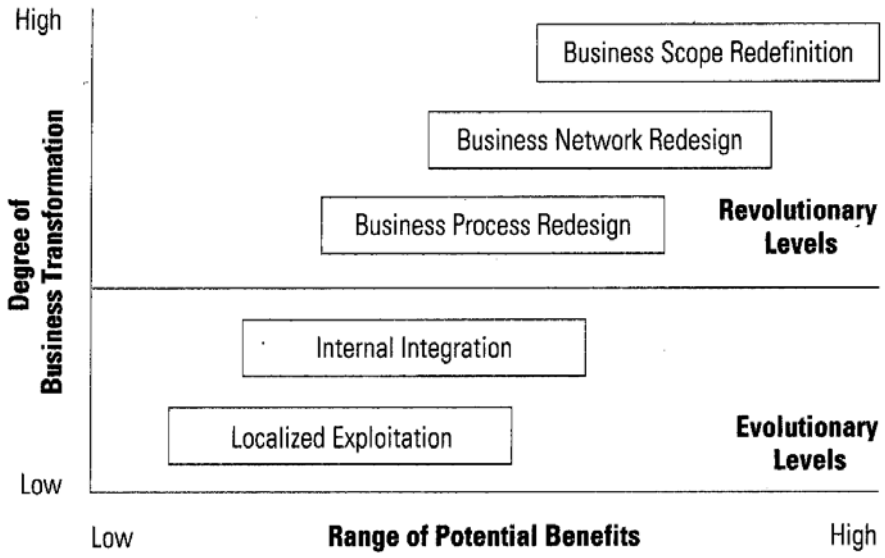

Figure 5. IT-Enabled Business Transformation Framework (Venkatraman, 1994).

Table 1

Definitions of IT-Enabled Business Transformation Framework Levels (Venkatraman, 1994.)

Level	Definition
Evolutionary Levels *(Business strategy tends to drive IT strategy)*	***Localized Exploitation*** – The first or lowest level of transformation, IT applications are implemented in accordance with existing business structures and are generally viewed as a means to improve efficiency and effectiveness of existing operational processes. Both IT integration and business process transformation are minimal at this level. Most IT applications at this level are standard offerings and are implemented in a stovepipe manner to meet the needs of specific groups within the organization. ***Internal Integration*** – An extension of localized exploitation, IT integration at this level is still considered primarily in support of the internal business strategy. More formal IT planning procedures and planning teams are employed in internal integration, and increased interdependence is noted among the groups within the organization. At this level of transformation, we begin to see IT applications such as database management systems, integrated databases, and Internet, intranet, or extranet technologies.
Revolutionary Levels *(IT assumes a stronger role in business strategy formulation)*	***Business Process Redesign*** – It is at this level of transformation that organizations begin to look to IT as a possible driver of business process change. In fact, the need for alignment between business and IT strategies is more readily recognized; and the focus begins to shift from a purely internal focus to also include an external focus. Within business process redesign, IT applications tend to be more current; and emerging IT trends are more favorably considered. ***Business Network Redesign*** – Within this level of transformation, the focus on external trading partners and business networks comes to the forefront. Organizations at this level recognize that IT integration alone is insufficient to realize significant benefits among the business network participants. Decision-making, business processes and value-added services are increasingly integrated to balance the IT capabilities deployed within the network. IT applications and resources at this level allow for unstructured information exchange across functional and geographical boundaries. ***Business Scope Redefinition*** – The most extensive of the transformation levels, business scope redefinition involves the use of IT to redefine the activities within the business network. Elimination of duplicate tasks among business network participants occurs at this level; and increased restructuring of the business network occurs. Coordination and decision-making are centralized at this level to balance the high levels of IT integration across the participating organizations. IT value is greatest at this level of transformation, assuming the organizational structure is in line with the IT capabilities.

Inherent in both the Strategic Alignment Model and the IT-Enabled Business Transformation Framework is the view of strategic alignment as a dynamic process of adaptation and change rather than as a static event. It is this dynamic process which is of particular interest in the current study. As interorganizational networks strive to make

strategic changes and to regain strategic fit at each new level of development, it is important to understand the benefits to the network of reaching higher levels of integration.

Henderson and Venkatraman (1993) suggested that the ability to innovate and leverage IT resources for continuous differentiation was more effective for organizational success than the development of a specific portfolio of static IT functionality. Further, the authors argued that the driving force for organizational transformation in a firm may shift from the business strategy to the IT strategy and vice versa over time. However, regardless of the driving force, the key is to ensure that fit between business and IT strategy is renewed in a timely manner in order to more fully realize improved organizational performance at different levels of business transformation (Henderson & Venkatraman, 1993; Venkatraman, 1994).

Measuring Strategic Fit

The IT literature lacks a consistent, well-documented measurement approach for strategic fit (Bergeron, Raymond, & Rivard, 2001). Six different perspectives of strategic fit measurement have been identified and examined by researchers (Chan et al., 1997; Bergeron et al., 2001). These six perspectives are summarized in Table 2.

Table 2

Six Common Approaches to Strategic Fit Measurement (Chan et al., 1997; Bergeron et al., 2001).

Perspective of Strategic Fit	Definition and Characteristics
Moderation	• Criterion-specific • Strategic fit represented as the interaction between two variables. • Impact of fit on firm performance generally assessed using correlations.

Mediation	• Criterion-specific • Intermediate or intervening variable is posited to mediate the relationship between one organizational variable and firm performance. • Generally use path analysis to evaluate this relationship.
Matching	• Not criterion-specific, but can assess relationship to firm performance. • Fit measured by how well two factors of fit match.
Covariation	• Not criterion-specific • Fit is measured by examining the level of internal consistency among related variables.
Profile Deviation	• Criterion-specific • Assumes an ideal profile exists for the variables of interest. • Deviations from ideal profile identified and measured. • Negative firm performance is posited when ideal profile is not achieved.
Gestalts	• Not criterion-specific. • Views fit as a pattern or trend. • Fit is examined by observation of clusters of attributes or gestalts that occur frequently.

Strategic fit has been examined through these different perspectives with varying degrees of success. For example, one study of interest examined the fit between the external environment and the business strategy as profile deviation (Venkatraman & Prescott, 1990). In doing so, these authors found a significant positive relationship between fit and firm performance. On the other hand, Chan et al. (1997) compared matching and moderation models of strategic fit in their study of the business units of a firm. The results produced the strongest support for moderation as the most beneficial perspective of strategic fit.

Others have adopted a matching perspective of strategic fit (Venkatraman, 1989a; Miller, Glick, Wang, & Huber, 1991; Raymond et al., 1995). The matching perspective views fit as "a match or equivalence between related variables (Chan & Huff, 1993, p. 350)." Chan and Huff (1993) offered the example of a study examining the fit between business and IT strategy. Fit would then be measured by how closely the IT strategy mirrored the business strategy and vice versa. Miller et al. (1991) investigated strategic fit as a match between the organization's external environment and its business strategy. In doing so, these authors noted a significant positive relationship between fit and performance when a match was achieved (Miller et al., 1991). Also adopting a matching perspective, Raymond et al. (1995) observed the greatest performance improvements in firms with good matches between IT management sophistication and formal business structure. Finally, the results of Bergeron et al's (2001) study of manufacturing and service firms provided additional support for the matching perspective. These authors found significantly better performance among those firms demonstrating the closest match between organizational structure and strategic IT management (Bergeron et al., 2001).

In summary, strategic fit has been investigated using a variety of perspectives and research techniques. In doing so, a cumulative body of literature exists regarding the general concepts of strategic fit. In addition, a foundational framework of strategic fit between IT and business strategy has been established and empirically supported at the firm level of analysis (Henderson & Venkatraman, 1993; Venkatraman, 1994; Raymond et al., 1995; Bergeron et al., 2001). These efforts have led to a more consistent agreement within the IT literature regarding the significant positive performance

improvements related to achieving strategic fit between business and IT strategies (Miller et al., 1991; Henderson & Venkatraman, 1993; Venkatraman, 1994; Chan et al., 1997; Bergeron et al., 2001).

Lacking in the IT literature is an investigation of strategic fit for the interorganizational network. Interorganizational networks are developing across many industries as important new business structures (Melville et al., 2004; Straub et al., 2004). Yet, researchers have failed to initiate and promote a comprehensive research agenda regarding the benefits of IT and, more specifically, the strategic fit of IT and business strategy at this level (Straub et al., 2004). It is this gap in the IT literature which the present research addresses. The present work follows a matching perspective of strategic fit, thereby examining the match between the level of IT integration within the interorganizational network and the level of organizational integration among the network participants. The following sections define in more detail two factors of strategic fit that are of interest in the current research.

Factors of Strategic Fit

Researchers suggest that successful interorganizational networks depend on the presence of two key attributes, namely interconnectedness and structural equivalence (Teo, Wei, & Benbasat, 2003). Interconnectedness is the existence of transactions and processes that tie the network participants together. Structural equivalence refers to the participant's position in the network and suggests that each participant attain a similar position within the interorganizational network structure (Teo et al., 2003). These key attributes lead us to the importance of strategic fit for interorganizational network success. Successfully achieving an equivalent level of IT integration and

interorganizational integration should lead to a balance between interconnectedness and structural equivalence, thereby improving business performance. Thus, in the sections that follow, the present study defines the two factors of strategic fit chosen for this research – IT integration and interorganizational integration.

IT integration. Defined as seamless, boundariless access to information from anywhere anytime (Knoedler, 2003), IT integration implies interconnectedness across the interorganizational network participants which allows for the sharing of information with minimal effort on the part of the end users (Waring & Wainwright, 2000). In the current work, IT integration extends to all facets of IT, including telecommunications, hardware, software, and data. IT integration is important to the current research due to its perceived critical role in the successful development and evolution of the interorganizational network (Dowling, 1997; Straub et al., 2004; Weiner et al., 2004).

To address the idea of IT integration and its impact on the organization, Weiner et al. (2004) developed the IT integration life cycle. Life cycle models have been used for a number of years throughout the organizational and IT literature. As Savitz, Kaluzny, and Kelly (2000) note, life cycles were originally adapted from the natural sciences, but take various forms in management research, from product life cycles to organization life cycles to IT project life cycles. For example, within the organizational literature, Cameron and Whetten (1981) used the 4-stage life cycle model of Quinn and Cameron (1980) to investigate perceptions of effectiveness and focus across different stages of organizational evolution. The authors observed an individualistic focus with a concern for effective resources in the earlier stages of the life cycle. To the contrary, as organizations evolved through the later stages of the life cycle, the focus seemed to shift

to the organization and the effectiveness of producing a quality output. Further, the later life cycle stages were also characterized by a more formal organizational structure with greater integration of processes and functions (Cameron & Whetten, 1981)[1].

Similarly, informed by innovation theory and organization theory, Weiner et al. (2004) developed the integration life cycle based on the premise of a recursive relationship between integration and organizational learning (Figure 6). Like Henderson and Venkatraman (1993), key to Weiner et al.'s (2004) life cycle was the need for fit between IT integration and organizational structure at each stage of development. Along these lines, Weiner et al. (2004) built upon the prior work of Savitz et al. (2000) to describe four stages of development across the integration life cycle – emergence, growth, maturity, and critical crossroads. The authors then extended these stages from an organizational focus to an interorganizational network focus. These stages are defined in Table 3.

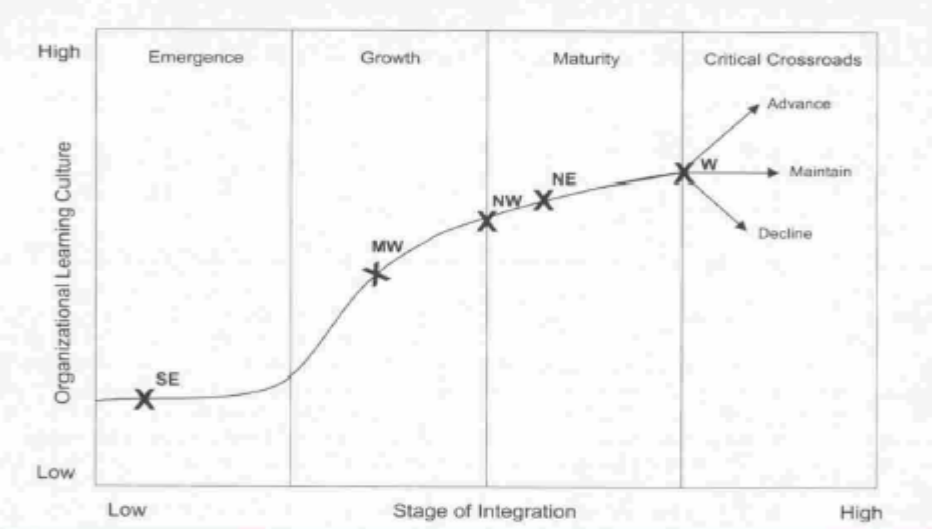

Figure 6. Integration Life Cycle (Weiner et al, 2004).

[1] For more information on organizational life cycles, see Cameron, K. S., & Whetten, D. A. (1981), Perceptions of Organizational Effectiveness over Organizational Life Cycles, *Administrative Science Quarterly, 26*(4), 525-544.

Table 3

Phases of Integration Life Cycle

Phase	Definition
Emergence	In the *emergence* phase, users have very limited experience with integration and innovation. The organization is beginning the transition toward change (Savitz et al, 2000). Also in this phase, IT decision-making is decentralized; and IT is viewed as business support rather than a strategic tool (Weiner et al, 2004).
Growth	The *growth* phase is characterized by rapidly increasing levels of tolerance for and willingness to change, as a result of successful innovations in the emergence phase (Savitz et al, 2000). IT planning in this phase appears to still be primarily decentralized with increasing levels of integration across groups within the organization. Organizations in this phase are beginning to recognize IT's potential as a strategic resource (Weiner et al, 2004).
Maturity	In the *maturity* phase, organizations have generally reached a sustained level of change tolerance, and numerous innovations have been successfully implemented (Savitz et al, 2000). IT is viewed as a strategic resource, and IT planning and control are more centralized than in earlier phases (Weiner et al, 2004).
Critical Crossroads	The *critical crossroads* phase is important in that it represents the point in time when the organization must make a decision to continue advancement of integration and change, maintain a status quo, or decline in its efforts to integrate and change (Savitz et al, 2000). In this phase, IT planning and control are centralized and well-established; user-led innovation is common; and new opportunities for change and innovation are sought (Weiner et al, 2004).

Moving through the stages of the life cycle, organizational learning and IT integration within the IDS were posited to follow a positive, nonlinear S-shaped curve, suggesting that as integration increases, interdependence and tolerance for change among organizations also increases and vice versa. More specifically, the authors illustrated the evolving role of IT from a support function in the emergence phase to a critical strategic resource in the maturity phase. Furthermore, the changing role of IT across the life cycle seemed to lead to greater value for interorganizational networks in later stages as opposed to those in earlier stages (Weiner et al., 2004). Thus, the propositions and ideas of the IT integration life cycle are of particular interest to the current study.

Interorganizational integration. The struggle to achieve higher quality and reduced costs has encouraged researchers and practitioners alike to consider the importance of an integrated organization for greater improvements (Bhatt, 2000; Kuwaiti & Kay, 2000; Waring & Wainwright, 2000; Lapiedra et al., 2004). An integrated organization is one in which functions, processes, and skills necessary for organizational success are integrated or shared within and across organizational boundaries (Kuwaiti & Kay, 2000). The keys to this type of integration are collaboration, cooperation, and consistency (Lapiedra et al., 2004).

Taking integration to the interorganizational network level suggests that the functions, processes, and government structures of otherwise autonomous organizations must now be combined in a cooperative, collaborative manner (Borys & Jemison, 1989; Oliver, 1990; Simeons & Scott, 2005). A goal of interorganizational networks has been the creation and advancement of specialized capabilities that are more likely to come to fruition as a result of integration, cooperation, and connectivity among network participants (Borys & Jemison, 1989; Alter & Hage, 1993; Simeons & Scott, 2005). Furthermore, these collaborative arrangements have not been limited by geography, organizational size, or industry type (Alter & Hage, 1993). Alter & Hage (1993) suggested that interorganizational networks that achieve a high level of business process integration are more able to take advantage of new opportunities and changes in the marketplace, thereby giving these networks a competitive advantage over those less integrated. The perceived importance of business process integration for improved performance is of great interest to the present study.

In summary, the current work conceptualizes and empirically investigates a model of strategic fit for the interorganizational network. Specifically, strategic fit is posited as the fit between the level of IT integration and a complementary level of interorganizational integration. Furthermore, this study examines potentially varying degrees of the impact of strategic fit on the interorganizational network's financial and quality performance across different levels of network maturity. Thus, the sections that follow review the relevant IT literature to support the conceptual model and associated hypotheses.

Hypotheses Development

Because the current work focuses on the relationship between strategic fit and interorganizational network performance, this section defines the quality performance and financial performance outcomes. In addition, the specific outcome variables of interest for the present research are identified and discussed. The pertinent literature is then reviewed, and a series of hypotheses are proposed.

Quality Performance Outcomes Defined

Interorganizational network quality outcomes are defined as intangible, quality-related measures of organizational service and performance (Li & Collier, 1999; Devaraj & Kohli, 2000). The present study has chosen quality outcomes as a measure of IDS performance due to the need for health care entities and networks to continually improve the quality of patient care (Snyder & Paulson, 2002). Patient-centered measures are generally used in studies of organizational performance in the health care industry, as the patient represents the consumer for this industry (Dowling, 1997; Devaraj & Kohli, 2000; Smith & Swinehart, 2001). Regarding the identification and definition of appropriate

quality performance outcomes for the health care IDS, research suggests measures such as mortality rate, patient satisfaction, patient days in the hospital, and other similar patient-centered measures (Dowling, 1997; Devaraj & Kohli, 2000; Smith & Swinehart, 2001).

The present study employs patient days in the hospital and mortality rate as measures of quality for the health care IDS. Initial formation and growth of IDSs in the early to mid-1990's resulted in reductions in patient days. For instance, Kim (2000) examined the impact of IDS formation on patient days in the 1990's and found that patient days was shorter on average 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 patient days 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 figures seem to indicate that these reductions may have slowed or stalled over the past three to five years (Rodgers & Lutz, 2003), suggesting that perhaps the formation of an IDS alone is not enough to ensure long-term quality improvements. Instead, the present research explores the possibility of a relationship between strategic fit of IT integration and interorganizational integration on patient days in the hospital.

Mortality rate is a critical measure of patient-care quality and a measure of focus in the health care industry (Dowling, 1997; Kim, 2000; Devaraj & Kohli, 2000; Smith & Swinehart, 2001). For good reason, an IDS is likely to embrace a technology, innovation, or strategy change that leads to a reduction in the mortality rate of patients. Thus, this measure seems appropriate for investigation in the present study.

Financial Performance Outcomes Defined

Financial performance has been measured in various ways in the IT literature. Some have examined profitability measures such as net profit, return on assets (ROA), and other similar indicators (Devaraj & Kohli, 2000). Others have chosen to address the impact of IT on the reduction of cost, such as operational cost (Byrd, Thrasher, Lang, & Davidson, 2005). While these measures have been commonly used in studies of IT impact, these same types of financial performance measures have also been used in studies more specifically targeted at the benefits of strategic fit (Chan & Huff, 1993; Chan et al., 1997; Palmer & Markus, 2000; Zajac, Kraatz, & Bresser, 2000).

For the purposes of the current study, operational cost, cost to charge ratio, and ROA have been chosen as measures of IDS financial performance. Use of operational and cost to charge measures in the context of health care satisfies two conditions. First, by exploring the impact of strategic fit on the reduction of operational costs, the sample selected may include both for-profit and not-for-profit IDSs, as both types are concerned with reducing costs despite their differences regarding profit-centered measures. Second, the health care industry in particular is facing increasing pressure to reduce costs while continuing to improve the quality of patient care (Snyder & Paulson, 2002); thus, it is important to examine the potential impact of IT and strategic fit on cost measures.

The very formation of health care 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 health care networks, researchers suggest that organizational changes alone may be insufficient to bring about

financial performance improvements for the IDS (Coddington & Moore, 2001).

Measures such as ROA and other similar ratios have been used frequently as financial performance indicators in organizational research across different disciplines (Keats & Hitt, 1988; Brown, Gatain, & Hicks, 1995). Though substantial support for a link between strategic fit and profit-centered and accounting measures has not been well-established in the IT literature (Chan & Huff, 1993; Palmer & Markus, 2000), market position has been identified as an important goal of health care IDSs (Dowling, 1997). Thus, the correlation of ROA to the market value of an organization, as suggested by researchers such as Ball and Brown (1968) and Gonesdes (1973) makes this an interesting performance measure for further investigation.

Strategic Fit to Performance Outcomes

Strategic fit has received much research attention over the past decade, particularly at the firm level of analysis (Henderson & Venkatraman, 1993; Chan & Huff, 1993; Venkatraman, 1994; Chan et al., 1997; Sabherwal & Chan, 2001; Zajac et al., 2000). Common to many of these studies, the aim has been to examine the impact of strategic fit on business performance in terms of both quality and financial outcome measures (Henderson & Venkatraman, 1993; Chan & Huff, 1993; Chan et al., 1997; Palmer & Markus, 2000; Zajac et al., 2000; Sabherwal & Chan, 2001). While the importance of strategic fit has been more consistently emphasized in the IT literature in recent years, some studies of strategic fit and the link to organizational performance have produced mixed results. For instance, Chan and Huff (1993) found strategic fit to have a significant positive influence on IT effectiveness but not on the chosen profit-oriented financial performance indicators. Further, Palmer and Markus (2000) obtained similar

results in their study of the retail sales industry. These authors were unable to find support for a significant positive link between strategic fit and improved financial performance.

Other researchers have expanded upon the work described above to suggest that perhaps the impact to financial and quality performance may be dependent upon the level at which strategic fit is attained (Zajac et al., 2000; Bergeron et al., 2001). Along these lines, Zajac et al. (2000) observed significant positive links between strategic fit and return on assets in savings and loan organizations who achieved advanced levels of strategic fit. These authors empirically supported the argument that greater benefit from strategic fit is realized when organizations respond in a timely manner to needed changes in strategy and then achieve fit within this new strategy. To the contrary, those who fail to make changes or fail to achieve fit once changes are made are less likely to realize financial benefits. In other words, similar to the views of Venkatraman (1994), Zajac et al. (2000) view strategic fit as a dynamic process of change and adaptation that, when pursued appropriately and in a timely manner, will enable financial performance improvements.

Hypothesis 1a. The strategic fit of IT integration and interorganizational integration will have a significant influence on IDS quality performance improvement.

Hypothesis 1b. The strategic fit of IT integration and interorganizational integration will have a significant influence on IDS financial performance improvement.

IT Integration to Performance Outcomes

Tapscott and Caston (1993) discussed the changing role of IT in the organization and the accompanying improvements that should result from new IT innovation and

increased IT integration. For example, these authors described the digital ticketing system implemented by Northwest Airlines in the late 1980's. In addition to implementing the new system, Northwest also integrated the ticketing system with other applications, such as the reservation system, flight operation system, and revenue collection system. In doing so, Northwest was able to implement expert systems that can identify backlogs, discrepancies in ticket revenue collection, and other information regarding the data attached to the ticket. As a result, the processing time for ticket revenue accounting was decreased by half, cash collections were significantly accelerated, and customer inquiry time was shortened. The combination of these improvements resulted in significant cost reductions for Northwest (Tapscott & Caston, 1993).

In a more recent study, an investigation of an electronic health record implementation and integration was conducted at Florida Hospital (Hamilton, Jacob, Koch, & Quammen, 2004). This was an intensive project aimed at re-engineering current clinical information processes and creating an integrated interdisciplinary electronic health record. In doing so, an advanced clinical application was integrated with existing financial and patient-management applications, thereby providing a single point of data access for personnel from a variety of functional areas within the hospital. Following completion of the project, a follow-up survey was done to measure overall satisfaction with the system and to assess potential performance improvements. Respondents reported an 88% approval rating, and hospital personnel identified specific tangible improvements. For instance, one nurse estimated patient-care savings of 30 minutes per patient per shift. Another reported a 50% decrease in physician to pharmacy

communication regarding patient medicine (Hamilton et al., 2004). As Hamilton et al. (2004) note, these improvements should translate into a shortened hospital stay for the patient and reduced costs for the hospital over time.

In another study from the health care industry, researchers examined the link between electronic entry of physicians' orders and operational cost. By entering the orders electronically, the system gave the hospital the ability to transmit electronic orders to wherever they were needed instantaneously, thereby providing an initial level of IT integration throughout the hospital. Thus, the pharmacy, lab, nurses' station, and other areas of the hospital received instant notification of patient needs and, in addition, could respond electronically with updates and additional information. The order entry implementation resulted in cost savings of 13.1% for the hospital as opposed to the use of paper orders (Bates, 2002).

Similarly, an experimental study of electronic patient order entry was conducted at a large hospital in Indiana (Tierney, Miller, Overhage, & McDonald, 1993). Employees of the hospital were divided into an experimental group and a control group. The experimental group was to use electronic order entry, while the control group continued with the traditional paper system. The link to ALOS was tested to determine potential differences between the two groups. Results of the experiment revealed that ALOS was 0.89 days shorter for patients admitted and treated by the experimental group than for those of the control group. This equates to a 10.5% reduction in hospital stay as a result of the use of electronic patient order entry, which should result in greater perceived quality of care and reduced costs for the hospital over time (Tierney et al., 1993).

Examining the individual factors of strategic fit for the present research, the following hypotheses are proposed:

Hypothesis 2a. IT integration and sophistication will have a significant influence on IDS quality performance improvement.

Hypothesis 2b. IT integration and sophistication will have a significant influence on IDS financial performance improvement.

Interorganizational Integration to Performance Outcomes

From the supply chain literature, researchers suggest that greater levels of integration, both in terms of IT and organizational integration, should lead to greater performance improvements for the supply chain participants. For instance, Frohlich and Westbrook (2001) demonstrated support for this idea in their study of supply chain integration. Examining varying degrees of organizational integration in terms of the expansiveness of the supply chain, the authors found that those considered to have the widest arc of integration also demonstrated the greatest performance improvements (Frohlich & Westbrook, 2001).

In his 1999 study of the benefits of IT for retail supply chains, Subramani found support for his proposition that IT use in interorganizational networks leads to closer cooperative relationships and greater organizational integration among the network participants. In turn, the interorganizational networks tend to be more able to develop specialized processes and expertise as IT integration increases. It is expected that these specialized processes and expertise will, over time, result in improved financial and quality performance for the interorganizational network (Subramani, 1999).

Hypothesis 3a. Interorganizational integration will have a significant influence on IDS quality performance improvement.

Hypothesis 3b. Interorganizational integration will have a significant influence on IDS financial performance improvement.

Mediating Role of Quality Performance

A number of studies have examined the indirect link between IT and financial performance as mediated by quality performance improvements (Barua, Kriebel, & Mukhopadhyay, 1995; Barua & Mukhopadhyay, 2000; Chen & Zhu, 2004; Byrd et al., 2005). As Barua et al. (1995) suggested, quite often the more immediate impact of IT integration and innovation is to the business functions and processes. The impact of IT is probably most readily evident in service and product quality improvements. In turn, these quality improvements should lead to better financial performance over time. Such was the case in Byrd et al. (2005). These authors analyzed data from Fortune 2000 firms to examine the relationship between IT quality and operational cost. The results supported a significant mediated link between IT quality and operational cost through improvements to business processes (Byrd et al., 2005). Therefore, while the direct relationship between strategic fit and IDS performance is of utmost importance to the present study, attention must also be given to the possibility of a mediated link to financial performance improvement through quality performance improvement. As such, the following hypotheses are offered:

Hypothesis 4a. The relationship between IT integration/sophistication and financial performance improvement will be partially mediated by quality performance improvement.

Hypothesis 4b. The relationship between interorganizational integration and financial performance improvement will be partially mediated by quality performance improvement.

Hypothesis 4c. The relationship between strategic fit and financial performance improvement will be partially mediated by quality performance improvement.

Relationships at Different Levels of Interorganizational Network Maturity

Research in recent years has established a more consistently positive link between strategic fit and organizational performance at the firm level (Zajac et al., 2000; Bergeron et al., 2001; Sabherwal & Chan, 2001). Moreover, researchers suggest that strategic fit is eminently dynamic, as it may be imitable by competitors over time. Thus, even at the interorganizational network level of analysis, networks must strive for continuous integration, change, and improvement. When strategic fit is achieved at each higher level of IT integration and interorganizational integration, these networks should anticipate further improvements to financial and quality performance beyond those achieved at the lower levels (Henderson & Venkatraman, 1993; Weiner et al., 2004).

The strategic fit literature supports the idea that strategic fit has a more significant impact on financial and quality performance among firms with high levels of IT integration and organizational maturity than among those with lower levels of IT integration and organizational maturity (Sabherwal & Chan, 2001; Smith & Swinehart, 2001). For instance, Sabherwal and Chan (2001) built upon the work of Miles and Snow (1978) regarding defenders, prospectors, and analyzers. In their study, Sabherwal and Chan (2001) identified IT strategy profiles appropriate for these different levels of organizational structure. The researchers empirically tested and found support for a

greater degree of business performance improvement among mature organizations with a focus on innovation and flexibility as opposed to immature organizations focused on operational efficiency.

Teo et al. (2003) also found support in the social contagion literature for increased benefits in more highly integrated aligned organizations. This literature suggests that adoption of an IT innovation or application may be more readily diffused across the members of an interorganizational network as individual network members demonstrate success with the innovation or application. This demonstrated success leads to more widespread adoption across the network which, in turn, leads to greater desire and tolerance for interconnectivity of current and future innovations across organizational boundaries (Teo et al., 2003).

A similarity exists between Teo et al.'s (2003) study and the IT integration life cycle (Weiner et al., 2004). Suggesting that IT integration exists in a recursive relationship with organizational learning, interorganizational networks evolve across higher levels of both organizational and IT integration as this cycle of innovation and learning continues. Further, these higher levels of integration result in greater financial and quality benefits for the network (Teo et al., 2003; Weiner et al., 2004).

Just as research suggests that strategic fit is a dynamic process rather than a static event, the current study proposes that the benefits of strategic fit are increased as new levels of IT integration and interorganizational integration are achieved (Henderson & Venkatraman, 1993; Hsiao & Ormerod, 1998). Therefore, the following hypotheses are proposed:

Hypothesis 5a. The strategic fit of IT integration/sophistication and interorganizational integration will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs.

Hypothesis 5b. The strategic fit of IT integration/sophistication and interorganizational integration will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.

The IT integration life cycle illustrates the proposition that greater performance improvements are anticipated in interorganizational networks with higher levels of IT integration as opposed to those with lower levels of IT integration (Weiner et al., 2004). The authors attribute this phenomenon to increased interdependence and organizational learning across network participants as success with IT integration accumulates. Eventually, a level is achieved at which network participants begin to initiate and lead efforts to further integrate and innovate throughout the network (Weiner et al., 2004). Further, higher levels of IT integration also lead to higher levels of interorganizational network integration as business processes, functions, and governance structures are increasingly integrated (Weiner et al., 2004).

As the role of IT has evolved from backoffice support to a strategic resource, greater quality and financial improvements have been noted in organizations who have capitalized on the strategic capabilities of IT (Beaudoin & Bogaert, 2003). By integrating IT applications and resources across interorganizational network participants, information sharing is made more efficient, effective, and timely. IT integration and greater information sharing are more likely to yield business process changes over time which will, in turn, result in improvements to quality and financial performance.

Along these lines, Beaudoin and Bogaert (2003) investigated the performance impacts of IT integration in 15 large IDSs. The results showed that quality and financial performance were more significantly improved in those IDSs that implemented integrated IT resources for new and more efficient business processes, as opposed to those who used IT simply for the automation of existing processes. Again looking to the IT integration life cycle (Weiner et al., 2004), IDSs in early stages of development are more likely to adopt IT as a means of supporting and automating existing business processes. On the other hand, those IDSs in later stages of maturity tend to demonstrate a more strategic use of IT and a greater level of IT integration.

IT integration can drive change from business process redesign to business network redesign. The difference is that business process redesign enables an organization to compete, while business network redesign provides opportunities for competitive advantage. These differences should translate to greater performance improvements for organizations that undertake business network redesign as opposed to those that choose business process redesign (Short & Venkatraman, 1992). Thus, the following hypotheses are offered:

Hypothesis 6a. IT integration and sophistication will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs.

Hypothesis 6b. IT integration and sophistication will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.

Hypothesis 7a. Interorganizational integration will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs.

Hypothesis 7b. Interorganizational integration will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.

Conceptual Model

The conceptual model for the present research is presented in Figure 7. The associated hypotheses are summarized in Table 4. Hypotheses 1a and 1b address the influence of strategic fit on interorganizational network quality and financial performance improvements. Hypotheses 2a and 2b regard the relationship between IT integration and interorganizational network quality and financial performance. Hypotheses 3a and 3b concern the relationship between interorganizational integration and interorganizational network quality and financial performance. Hypotheses 4a, 4b, and 4c address the issue of mediation between quality and financial performance. Finally, hypotheses 5a through 7b address the difference in the nature and strength of the relationships hypothesized above across two distinct levels of interorganizational network maturity.

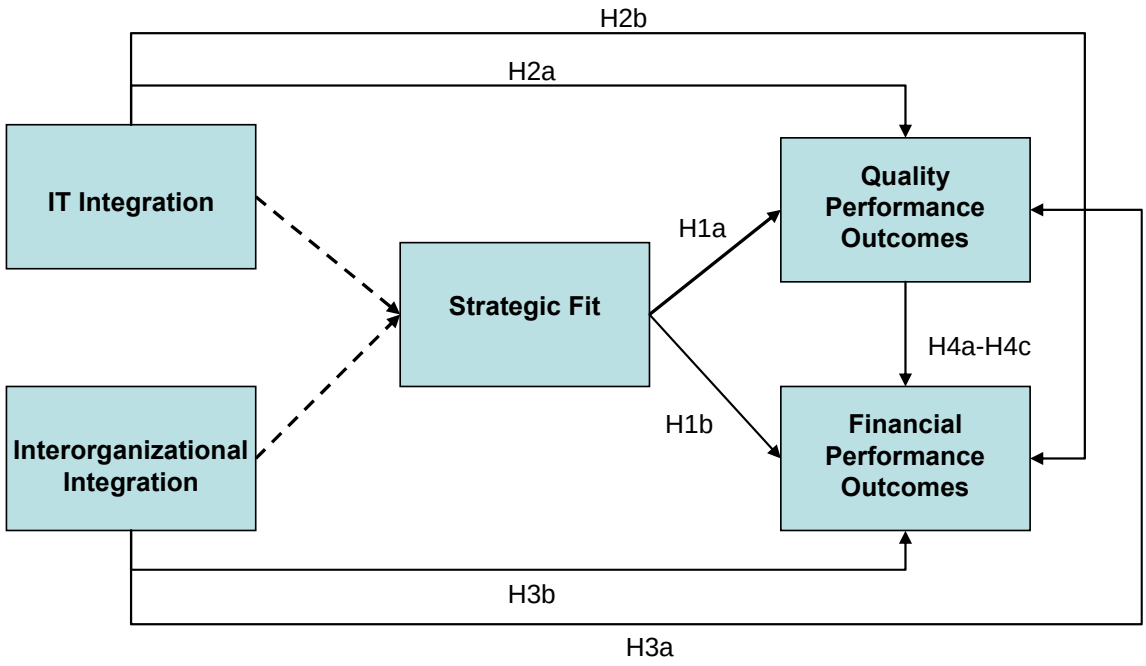

Figure 7. Hypothesized relationships of strategic fit to interorganizational network performance.

Table 4

Summarization of Research Hypotheses

Hypotheses
Hypothesis 1a. The strategic fit of IT integration and sophistication and interorganizational integration will have a significant influence on IDS quality performance improvement.
Hypothesis 1b. The strategic fit of IT integration and sophistication and interorganizational integration will have a significant influence on IDS financial performance improvement.
Hypothesis 2a. IT integration and sophistication will have a significant influence on IDS quality performance improvement.

Hypothesis 2b. IT integration and sophistication will have a significant influence on IDS financial performance improvement.

Hypothesis 3a. Interorganizational integration will have a significant influence on IDS quality performance improvement.

Hypothesis 3b. Interorganizational integration will have a significant influence on IDS financial performance improvement.

Hypothesis 4a. The relationship between IT integration and sophistication and financial performance improvement will be partially mediated by quality performance improvement.

Hypothesis 4b. The relationship between interorganizational integration and financial performance improvement will be partially mediated by quality performance improvement.

Hypothesis 4c. The relationship between strategic fit and financial performance improvement will be partially mediated by quality performance improvement.

Hypothesis 5a. The strategic fit of IT integration and sophistication and interorganizational integration will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs.

Hypothesis 5b. The strategic fit of IT integration and sophistication and interorganizational integration will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.

Hypothesis 6a. IT integration will have a significantly stronger negative influence on IDS quality performance improvement in mature IDSs than in immature IDSs.

Hypothesis 6b. IT integration and sophistication will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.

Hypothesis 7a. Interorganizational integration will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs.

Hypothesis 7b. Interorganizational integration will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.

The present chapter has used the health care IDS to define and illustrate the interorganizational network, the level of analysis for this research. This chapter has also discussed the foundational theories and literature upon which the conceptual model is built, along with identifying the factors of strategic fit pertinent for the present study. Finally, a series of hypotheses have been developed for investigation in the current research. Chapter 3 describes the methodology chosen to test the conceptual model and associated hypotheses. The population and sample of interest are described, and the necessary steps for data collection and analysis are discussed.

CHAPTER III

METHOD

The current study contributes to the body of knowledge regarding strategic fit by developing and testing a model of strategic fit for the interorganizational network, a perspective not currently addressed in the IT literature (Straub et al., 2004). To do so, a conceptual model has been proposed and will be empirically tested using a sample of currently active US health care IDSs. Of particular interest to the present study is the difference in the nature and strength of the impact of strategic fit between distinct levels of interorganizational network maturity. Therefore, in addition to testing the hypothesized relationships between strategic fit and network performance for the entire sample of IDSs, a classification process was developed to categorize the IDSs into appropriate groups. Additional analysis of the model was done to make comparisons between these groups.

Data for the present research was collected using a survey instrument and secondary data from two health care databases. The research design for this study is most clearly classified as positivist research. "Positivist studies are premised on the existence of a priori fixed relationships within phenomena which are typically investigated with structural instrumentation. Such studies serve primarily to test theory, in an attempt to increase predictive understanding of phenomena (Orlikowski & Baroudi, 1991, p. 5)."

Survey methodology has been advocated as a means of gathering data in a timely, economical, practical manner (Babbie, 2001; Creswell, 2003) from a large sample of the population (Roberts, 1999). In addition, survey methodology allows researchers to identify potential attributes, characteristics, and relationships about a larger population of interest from a representative sample (Creswell, 2003; Roberts, 1999). The present research utilized a cross-sectional survey of the chosen sample through a self-administered electronic questionnaire (Fink, 1995; Nesbary, 2000). The following sections describe in greater detail the population of interest, the data collection procedure, and the data analysis techniques used to conduct this research.

Participants

The population of interest was the approximately 450 active US IDSs, as identified in the 2006 HIMSS Analytics Database. These IDSs represented a broad spectrum of diversity, size, geographic reach, and comprehensiveness of patient care. Because of the use of email to recruit participants and to distribute the link to the survey instrument, the CIO for all IDSs in the population with valid email addresses were invited to participate in the study and to complete the survey instrument. The CIO was chosen due to the need for survey participants to have a broad level of understanding and knowledge regarding the current organizational structure and strategy and the complementary IT resources.

Procedure

Secondary Data

Two important sources of data for the present study were secondary data obtained from the HIMSS Analytics Database and the American Hospital Directory. This data

served two purposes. First, data collected from the HIMSS Analytics Database was combined with survey data to measure the independent variables. Second, data from the American Hospital Directory was used to measure the dependent performance variables.

Primary Data

A survey instrument was used to collect primary data regarding the independent variables. Likert-type scales were developed from prior research and multiple existing instruments to supplement the data available in the HIMSS Analytics Database. Because the goal of the present research was to extend theory and prior research, the survey was developed primarily from multiple existing scales rather than introducing a new instrument (Byrd & Turner, 2000; Lewis & Byrd, 2003; Nahm, Vonderembse, & Koufteros, 2003). Prior to administration of the survey, a pretest was conducted using doctoral students and professors from management information systems, organizational behavior, strategic management, and human resource management. As a result of the pretest, the wording of some of the items was refined to improve clarity for this study.

Survey administration. The survey administration process began in March, 2006. Participation invitations were emailed to the CIO of all active US IDSs listed in the HIMSS Analytics Database with valid email addresses, resulting in invitations being sent to 374 CIOs (Appendix A). Included in the request was a description of the study, the purpose, and the objectives, as well as a link to the survey. Participants were asked to provide the name of their respective IDS so that primary data could be matched to the secondary data. However, assurance was given that no identifying information would be included in the current manuscript, any future manuscripts, or any summarized reports of study results. Participants were offered a copy of the summarized study results for their

willingness to complete the survey. Sponsorship for this research was provided by HIMSS Analytics. Thus, a copy of the sponsorship letter was attached to all invitation emails (Appendix B). Reminder emails were sent at 2-week intervals, for a total of 4 emails.

Measures

IT Integration and Sophistication

In his study of IT resources and IDS success, Kilbridge (1998) identified critical IT resources as those that support a variety of functions, support interorganizational email capabilities, provide communication technology across the IDS, and enable immediate access to hospital data from IDS entities outside the hospital setting. In line with Kilbridge's (1998) suggestions, four facets of IT integration and sophistication were measured using data from HIMSS Analytics and existing scales.

First, IT integration was measured using a scale developed by Byrd & Turner (2000). Consisting of six items, this scale is designed to assess the flexibility of an organization's IT resources to provide integration and seamless sharing of information throughout the organization. Second, the sophistication of the IDS's resources was measured using data from HIMSS Analytics. More specifically, six data items were retrieved from HIMSS Analytics to measure the number of enterprise applications in use by the IDS, the number of active network nodes, and the ease of access to the internet and intranet by the end users. Third, IT modularity was measured using a scale developed by Byrd & Turner (2000). This scale was designed to assess the perceived modularity, ease of information access, and ease of application development within the organization.

In addition to the importance of the integration and sophistication of an organization's IT resources, researchers have noted the importance of an IT steering team for more effective integration and strategic fit (Lewis & Byrd, 2003; Karami, Bhattacherjee, Gupta, & Somers, 2000). The steering team is generally composed of IT management, IT personnel, and representatives of the various business areas within the organization. This team is charged with oversight of IT planning, alignment with the business structure, and ensuring IT support for the business strategy (Lewis & Byrd, 2003; Karami et al., 2000). Steering team effectiveness was measured using a scale developed by Lewis & Byrd (2003). This scale was designed to assess the existence and appropriateness of organizational IT plans and the degree of widespread participation in and effectiveness of an IT steering team.

Interorganizational Integration

A mature IDS must be able to provide consistent high quality, cost-effective patient care across a wide geographic area, to a large service population, from multiple diverse health care providers (Parker, Charns, & Young, 2001). Further, a successful IDS is one comprised of a wide range of specialty participants that, in turn, are able to reduce clinical variation and redundancy (Fischer & Coddington, 1998). In support of these arguments, five factors of interorganizational integration were measured using both secondary data and primary survey data.

IDS complexity was measured using the following data from the HIMSS Analytics Database: the number of facilities in the IDS; the diversity of the services offered, as calculated by the number of different types of entities participating in the IDS; the age of the IDS; and the geographic reach of the IDS, as represented by the number of

cities served by the IDS. The effectiveness of cross-functional teams and the level of communication within the IDS were measured using two 5-item scales developed by Nahm et al. (2003). In addition, the level of collaboration and business process integration among the organizations of the IDS was measured using items developed for the present study.

Strategic Fit

Strategic fit was measured as a second order formative construct comprised of IT integration and sophistication and a complementary level of interorganizational integration. "Formative indicators are used to form a superordinate construct where the individual indicators are weighted against their relative importance in forming the construct (Teo et al., 2003, p. 30)." A recent study of interorganizational networks examined five properties of network structure: centrality, size, complexity, differentiation, and connectedness (Schumaker, 2002). The present research examined each of these as factors of both IT integration and interorganizational integration. Then, in turn, equivalent levels of IT integration and interorganizational integration within the IDS resulted in the achievement of strategic fit.

Performance Outcomes

Quality performance outcomes were measured using patient days in the hospital and mortality rate. Financial performance outcomes were measured by annual operational cost, the cost to charge ratio, and return on assets (ROA). All performance measures were obtained for each IDS from the American Hospital Directory. The measures described, along with their respective sources, are summarized in Table 5.

Table 5

Summary of Study Measures

Scale/Measure		Source
IT Integration and Sophistication		
Information Technology Integration		Byrd and Turner (2000)
ITI1	Flexible electronic links exist between all entities of the IDS.	
ITI2	Our IDS utilizes open systems network mechanisms to boost connectivity.	
ITI3	Our user interfaces provide transparent access to all platforms and applications	
ITI4	Data received by our IDS from electronic links (e.g. EDI, EFT) are easily interpretable	
ITI5	Information is shared seamlessly across our IDS, regardless of the location.	
ITI6	Our IDS provides multiple interfaces or entry points (e.g. Web access) for external end users.	
Information Technology Planning		Lewis and Byrd (2003)
ITP1	A plan exists for IDS-wide information technology.	
ITP2	Our information technology plan reflects business goals.	
ITP3	An information technology steering team/advisory committee is active within our IDS.	
ITP4	Senior management participates in the information technology steering team/advisory committee.	
ITP5	Users participate in the IT steering team/advisory committee.	
ITP6	A formal methodology for information technology development is in place in our IDS.	
Information Technology Sophistication		HIMSS Analytics
ITS1	Number of enterprise applications currently in use by the IDS	
ITS2	Number of application types currently	

	in use by the IDS	
ITS3	Number of wireless access points	
ITS4	Number of hospitals with intranet access	

Information Technology Modularity		Byrd and Turner (2000)
ITM1	Reusable software modules are widely used in new systems development.	
ITM2	Our databases are able to communicate through many different protocols.	
ITM3	The development of new applications is not restricted by legacy systems within our IDS.	
ITM4	A common view of our IDS's patients is available to everyone in the IDS.	
ITM5	Data captured in one part of our IDS are immediately available to everyone in the IDS.	

Interorganizational Integration

Cross-Functional Teams		Nahm, Vonderembse, and Koufteros (2003)
CFT1	Our tasks are done through cross-functional teams.	
CFT2	Our employees are assigned to work in cross-functional teams.	
CFT3	Our employees are required to work in cross-functional teams.	
CFT4	Our managers are assigned to lead cross-functional teams.	
CFT5	Our most important tasks are carried out by cross-functional teams.	

Communication		Nahm, Vonderembse, and Koufteros (2003)
COM1	Managers throughout our IDS communicate frequently.	
COM2	Employees throughout our IDS communicate frequently.	
COM3	Relevant work groups are quickly notified of strategic decisions.	
COM4	Employees across different levels of the IDS hierarchy communicate easily.	
COM5	Employees can easily meet and	

	communicate with upper management.	
Collaboration		Developed for this study
COL1	Managers across IDS organizations collaborate to solve problems.	
COL2	Employees across IDS organizations collaborate to solve problems.	
COL3	The IDS organizations partner with one another to address patient care needs.	
COL4	The IDS organizations partner with one another to address operational needs.	
COL5	The IDS organizations form a close relationship with the patient.	
Business Process Integration		Developed for this study
BPI1	Redundant administrative processes are extremely low.	
BPI2	The billing functions for the IDS are done at a centralized location.	
BPI3	Most administrative tasks for the IDS are done at a centralized location.	
BPI4	The patient registration functions for the IDS are typically completed at a centralized location.	
IDS Complexity		HIMSS Analytics
IDSC1	Number of facilities in the IDS	
IDSC2	Number of different facility types in the IDS	
IDSC3	Geographic reach (i.e. number of different cities served by the IDS)	

Data Analyses

IDS Classification Process

In order to make comparisons between mature and immature IDSs, the present study used a two-step classification process involving profile matching (Chan et al., 1997). The first step employed a rating scale to identify those IDSs that have achieved

strategic fit. To do so, each measure of IT integration and sophistication and interorganizational integration was standardized using z-scores. The result was a mean of 0 for all measures, thereby, allowing for more effective comparisons across the IDSs in the sample, regardless of the measure examined. Then, a six-point rating scale was developed based on the resulting z-scores. The scale, as depicted in Figure 8, ranged from a value of 1 (extremely low integration with a z score between -2 and -3) to 6 (extremely high integration with a z score between 2 and 3).

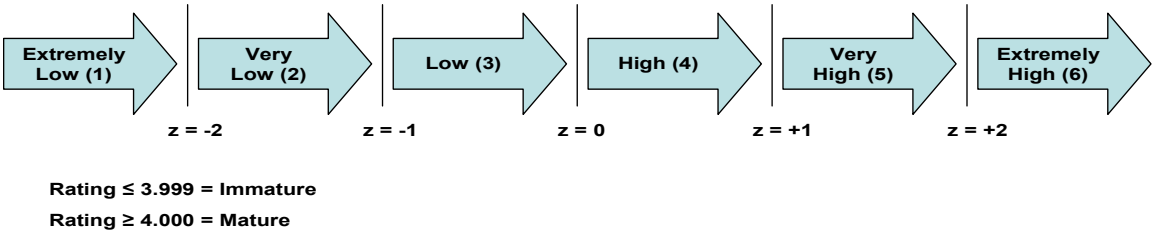

Figure 8. IDS maturity rating scale.

Each IT integration and sophistication attribute was rated; then the ratings were averaged to form an overall IT integration and sophistication rating. The same was done for the interorganizational integration attributes. Finally, the two ratings were compared. If the whole number ratings associated with both IT integration and sophistication and interorganizational integration indicated the same level of maturity, the IDS was deemed to have achieved strategic fit and remained in the sample. On the other hand, if the whole number ratings represented two different levels of maturity, a mismatch was declared. The IDS was then removed from the sample.

The second step of the classification process categorized the remaining IDSs in the sample as either mature or immature based on the level of IT integration and sophistication and interorganizational integration within the IDS. This step is necessary

to facilitate comparisons of the strategic fit – performance relationship across two distinct levels of IDS maturity. Therefore, the whole number rating for IT integration and sophistication and interorganizational integration designated the strategic fit rating for the IDS. As Figure 8 also illustrates, an IDS with a strategic fit rating of 4 or greater was classified as mature, while an IDS with a strategic fit rating of 3 or below was classified as immature.

Confirmatory Factor Analysis

Empirical examinations of the model and the hypotheses of the current study were conducted in two parts. First, using the full sample of IDSs, confirmatory factor analysis was conducted for all latent constructs in the model. Goodness of fit for the measurement model was assessed using several fit indices, such as the ratio of chi-square to degrees of freedom, the comparative fit index (CFI), the incremental fit index (IFI), the root mean square error of approximation (RMSEA), and other similar measures (Hair, Anderson, Tatham, & Black, 1998). In addition, the strength of factor loadings was examined. Potential adjustments to the measurement model were considered only if appropriate and theoretically supported.

Test for Measurement Invariance

In addition to tests of reliability and validity, the present research conducted tests for measurement invariance. A comparison of relationships across distinct groups was made. As noted by Vandenberg and Lance (2000), as well as Vandenberg (2002), these tests were a necessary step in the data analysis process. The tests assess the ability of the survey instrument to measure the constructs of interest equivalently across both groups of IDSs.

Hypotheses Tests

Hypotheses 1a through 3b were tested using Partial Least Squares (PLS) (Chin, 2001). This approach was used due to the ability of PLS Graph to handle formative relationships, a capability not presently available in other structural equation modeling packages. Hypotheses 4a through 6b, which compared strategic fit – performance relationships between mature and immature IDSs, were tested using t-tests based on the path coefficients of each group (Chin, 2001). When both groups demonstrated a significant relationship with a common direction, t-tests were used to assess differences. However, when the direction of the relationship was different across groups or one group failed to demonstrate significance, further testing was not deemed necessary.

CHAPTER IV

RESULTS

This chapter presents the results of steps taken in the quantitative analysis of the research data and is divided into three sections. The first section addresses data preparation and classification of IDSs into mature and immature groups. The second section presents the results of the confirmatory factor analysis and tests for multigroup measurement invariance. The third section presents the test results for 14 hypotheses, as developed and listed in Chapter 2.

Data Preparation and Classification of Sample Groups

Survey Response

The survey was administered electronically, using an online survey instrument. Invitations to participate in the study were distributed via email containing a hyperlink to the survey instrument (Appendix A). Thus, from the total population of 450 IDSs contained in the HIMSS Analytics 2005 Database, those with an email address for the CIO were identified, resulting in an initial sample of interest of 394 IDSs. Of the 394 IDSs sent the first email invitation, 25 were returned due to invalid email addresses or electronic refusals of email delivery. Five email addresses were corrected and the email invitation was resent, resulting in a final sample of interest of 374 IDSs. After the initial email invitation and three subsequent email reminders, 80 IDSs responded, for a response

rate of 21.4%. Of those, 5 had incomplete data and were removed, for a final sample size of 75.

IDS Classification

Using the IDS classification process described in Chapter 3, all IDSs in the sample were identified as either mature or immature based on the overall strategic fit rating assigned. Two IDSs demonstrated a mismatch between the IT integration and sophistication rating and the interorganizational integration rating, meaning that one rating indicated immaturity while the other indicated maturity. As such, these IDSs were deemed to lack strategic fit and were eliminated from the study. Final classifications resulted in a mature group of 33 IDSs and an immature group of 42 IDSs. The average strategic fit rating for the mature group was 4.00, while the average strategic fit rating for the immature group was 2.88. The descriptive statistics and average ratings for the constructs are presented in Table 6.

Table 6

Descriptive Statistics and Ratings

Scale	All[a]		Mature[b]		Immature[c]	
	M	*SD*	*M*	*SD*	*M*	*SD*
IT Integration and Sophistication						
IT Integration						
ITI1	3.85	1.14	4.42	0.75	3.40	1.19
ITI2	3.80	0.92	4.12	0.65	3.55	1.02
ITI3	3.13	1.39	3.73	0.98	2.67	1.12
ITI4	3.63	0.75	4.06	0.35	3.29	0.81
ITI5	3.37	1.15	4.03	0.77	2.86	1.14
ITI6	3.95	0.96	4.33	0.69	3.64	1.03
Overall IT Integration	3.62	1.06	4.12	0.75	3.23	1.11
IT Integration Rating	---	---	*4.00*	*0.43*	*3.19*	*0.59*
IT Planning						
ITP1	4.37	0.88	4.70	0.47	4.12	1.04
ITP2	4.53	0.64	4.85	0.36	4.29	0.71

ITP3	4.44	0.76	4.64	0.82	4.29	0.67
ITP4	4.47	0.74	4.73	0.52	4.26	0.83
ITP5	4.24	0.91	4.55	0.75	4.00	0.96
ITP6	3.89	1.03	4.42	0.79	3.48	1.02
Overall IT Planning	4.32	0.86	4.65	0.65	4.07	0.92
IT Planning Rating	---	---	*3.76*	*0.50*	*3.17*	*0.85*
IT Modularity						
ITM1	3.07	1.04	3.45	0.97	2.76	1.01
ITM2	3.51	1.04	3.94	0.79	3.17	1.10
ITM3	3.29	1.15	3.52	1.20	3.12	1.09
ITM4	3.75	1.20	4.42	0.79	3.21	1.20
ITM5	3.49	1.16	4.18	0.77	2.95	1.13
Overall IT Modularity	3.42	1.14	3.90	0.98	3.04	1.12
IT Modularity Rating	---	---	*4.00*	*0.61*	*3.14*	*0.72*
IT Sophistication						
ITS1	30.77	44.24	33.82	32.64	28.38	51.84
ITS2	9.11	2.32	9.55	1.91	8.76	2.56
ITS3	101.45	222.92	59.04	85.59	132.08	281.20
ITS4	5.01	8.16	5.50	9.84	4.63	6.66
IT Sophistication Rating	---	---	*3.39*	*0.50*	*3.43*	*0.63*
Interorganizational Integration						
Cross-Functional Teams						
CFT1	4.12	0.70	4.45	0.51	3.86	0.72
CFT2	4.00	0.82	4.36	0.49	3.71	0.92
CFT3	3.47	0.99	3.94	0.70	3.09	1.03
CFT4	3.87	0.78	4.12	0.65	3.67	0.82
CFT5	3.96	0.88	4.30	0.73	3.69	0.90
Overall Cross-Functional Teams	3.88	0.86	4.24	0.64	3.60	0.91
Cross-Functional Team Rating	---	---	*4.00*	*0.61*	*3.17*	*1.01*
Communication						
COM1	3.71	0.87	4.12	0.65	3.38	0.88
COM2	3.33	0.91	3.85	0.62	2.93	0.89
COM3	3.45	0.86	3.91	0.58	3.10	0.88
COM4	3.45	0.90	3.97	0.59	3.05	0.91
COM5	3.75	0.92	4.18	0.68	3.40	0.94
Overall Communication	3.54	0.90	4.01	0.63	3.17	0.91
Communication Rating	---	---	*4.00*	*0.56*	*3.12*	*0.80*
Collaboration						
COL1	3.92	0.78	4.33	0.54	3.60	0.80
COL2	3.55	0.87	4.09	0.58	3.12	0.83
COL3	3.89	0.83	4.27	0.57	3.60	0.89

COL4	3.85	0.80	4.27	0.63	3.52	0.77
COL5	3.75	0.68	4.09	0.58	3.48	0.63
Overall Collaboration	3.79	0.80	4.21	0.58	3.46	0.80
Collaboration Rating	---	---	*4.12*	*0.55*	*3.05*	*0.82*
Business Process Integration						
BPI1	2.92	1.02	3.56	0.98	2.43	0.74
BPI2	3.64	1.33	4.28	1.02	3.14	1.34
BPI3	3.38	1.25	4.06	1.08	2.86	1.12
BPI4	2.42	1.09	2.97	1.18	2.00	0.80
Overall Business Process Int.	3.09	1.26	3.72	1.17	2.61	1.11
Business Process Int. Rating	---	---	*4.03*	*0.68*	*3.17*	*0.66*
IDS Complexity						
IDSC1	41.87	46.47	37.33	24.45	45.43	58.32
IDSC2	4.53	1.08	4.61	1.00	4.48	1.15
IDSC3	14.81	19.20	13.97	12.00	15.48	23.49
IDS Complexity Rating	---	---	*3.30*	*0.53*	*3.55*	*0.71*

Note. N^a*=75.*
N^b*=33.*
N^c*=42.*

Confirmatory Factor Analysis and Multigroup Measurement Invariance

Confirmatory Factor Analysis

Using the full sample of 75 IDSs, confirmatory factor analysis was conducted in AMOS 5 to assess the goodness of fit for each construct. Two constructs, IT Sophistication and IDS Complexity, demonstrated poor fit. Modification indices and low factor loadings were employed in an attempt to improve fit; however, the supported changes had little impact on the fit indices for the full dataset. Similar attempts were made to determine if either construct demonstrated better fit for one group versus the other; however, these constructs exhibited poor fit with both groups and were unresponsive to changes and modifications. As a result, IT Sophistication and IDS Complexity were removed from the model. Additionally, ITM3 was removed from the

IT Modularity scale due to a low factor loading of .26. As presented in Table 7, the goodness of fit indices indicated acceptable fit for all remaining constructs.

Table 7

Confirmatory Factor Analysis

Measurement	Range of Standardized Factor Loadings	NFI	IFI	CFI	RMSEA
IT Integration and Sophistication	0.48-0.81	0.93	1.00	1.00	0.00
IT Planning	0.71-0.83	0.86	0.90	0.90	0.16
IT Modularity	0.63-0.83	0.86	0.90	0.89	0.16
Cross-Functional Teams	0.79-0.87	0.94	0.97	0.96	0.12
Communication	0.69-0.87	0.91	0.93	0.93	0.19
Collaboration	0.60-0.84	0.88	0.91	0.91	0.19
Business Process Integration	0.59-0.87	0.99	1.00	1.00	0.00

Note: N=75.

Scale Reliability and Validity

Assessing reliability among the items of each factor is a critical step in the data analysis process. Cronbach's alpha, obtained from AMOS 5, and the composite reliability, obtained from PLS Graph 3, were used to assess scale reliabilities. A coefficient alpha of at least .70 is indicative of strong covariance among the items and suggests a satisfactory sampling domain (Hair et al., 1998; Hinkin, 1998; Nunnally, 1978). All factors demonstrated acceptable Cronbach's Alpha and composite reliability levels, ranging from .70 to .89 and .83 to .92, respectively.

A measure of factorial validity common to PLS is the Average Variance Extracted

(AVE). While strict thresholds for this measure are yet to be determined, an AVE of at least .50 is desirable (Gefen & Straub, 2005; Hair, et al., 1998). As such, each factor demonstrated AVEs very near or above the suggested threshold, ranging from .46 to .69. The reliability and validity measures are summarized in Table 8.

Table 8

Scale Reliabilities and Intercorrelations

Scale	1	2	3	4	5	6	7
1. IT Integration	(.76 .83 .46)						
2. IT Planning	.46	(.85 .89 .58)					
3. IT Modularity	.77	.40	(.70 .84 .57)				
4. Cross-Functional Teams	.57	.44	.46	(.89 .92 .69)			
5. Communication	.45	.43	.38	.56	(.87 .91 .66)		
6. Collaboration	.52	.32	.45	.63	.72	(.84 .89 .61)	
7. Business Process Integration	.56	.45	.53	.47	.56	.47	(.79 .86 .62)

Note: Cronbach's Alpha, composite reliability, and AVE designated in the diagonal.

Multigroup Measurement Invariance Tests

Vandenberg and Lance (2000) have suggested tests of measurement equivalence across groups should be a logical extension of confirmatory factor analysis. "Violations of measurement equivalence assumptions are as threatening to substantive interpretations as is an inability to demonstrate reliability and validity (Vandenberg & Lance, 2000, p.6)". Tests were conducted for each construct separately due to an incapability to specify formative second-order constructs in AMOS 5. To complete the invariance tests, three steps were performed as specified in Byrne, 2004. First, goodness of fit was evaluated for an unconstrained measurement model using the data for both groups simultaneously. This model served as a baseline model for all subsequent tests. Second, variances, covariances, and factor loadings were constrained to be equal across both groups in order to test for metric invariance. The resulting model was then compared to the baseline model to determine if changes to chi square were significant. Finally, item level invariance was tested by constraining the factor loadings for each item equally across both groups. Again, the resulting chi square was compared to the baseline to determine significance of changes. The test results are shown in Table 9 and indicate no evidence of measurement variance between the mature and immature groups.

Table 9

Goodness-of-fit Statistics for Tests of Measurement Invariance

Model Description	χ^2	*df*	$\Delta\chi^2$	Δdf	*Statistical Significance of* $\Delta\chi^2$
Information Technology Integration					
1. Hypothesized Model	22.699	18	---	---	---
2. Factor loadings, variances, and covariances constrained equal	31.733	24	9.034	6	Not significant
3. Factor loadings constrained equal	28.346	23	5.647	5	Not significant

Information Technology Planning					
1. Hypothesized Model	8.854	4	---	---	---
2. Factor loadings, variances, and covariances constrained equal	15.933	8	7.079	4	Not significant
3. Factor loadings constrained equal	15.160	7	6.306	3	Not significant
Information Technology Modularity					
1. Hypothesized Model	6.513	4	---	---	---
2. Factor loadings, variances, and covariances constrained equal	18.090	8	11.577	4	$p<.05$
3. Factor loadings constrained equal	13.553	7	7.020	3	Not significant
Cross-Functional Teams					
1. Hypothesized Model	8.366	4	---	---	---
2. Factor loadings, variances, and covariances constrained equal	16.176	8	7.810	4	Not significant
3. Factor loadings constrained equal	8.909	7	0.543	3	Not significant
Communication					
1. Hypothesized Model	12.066	4	---	---	---
2. Factor loadings, variances, and covariances constrained equal	17.626	8	5.560	4	Not significant
3. Factor loadings constrained equal	14.092	7	2.026	3	Not significant
Collaboration					
1. Hypothesized Model	22.300	10	---	---	---
2. Factor loadings, variances, and covariances constrained equal	27.695	15	5.395	5	Not significant
3. Factor loadings constrained equal	24.794	14	2.494	4	Not significant
Business Process Integration					
1. Hypothesized Model	1.241	4	---	---	---
2. Factor loadings, variances, and covariances constrained equal	7.524	8	6.283	4	Not significant
3. Factor loadings constrained equal	7.276	7	6.035	3	Not significant

Hypotheses Tests

Partial Least Squares conducted in PLS-Graph 3.0 was used to analyze the path model due to the small sample size and the need to include second-order formative constructs (Sambamurthy & Chin, 1994; Byrd, et al., 2005). Though the sample size was small, it still met the generally accepted requirements for PLS of at least 10 observations for each predictor in the most complex relationship (Barclay, Higgins, & Thompson, 1995; Chin, 1998). In addition, t-tests were used where necessary to assess the

significance of differences between the path coefficients of the mature and immature IDSs. Because the hypotheses suggested a stronger relationship for mature IDSs, one-tail significance levels were used (Hair, et al., 1998).

Combined Sample

Strategic fit. Hypotheses 1a to 4c addressed the paths of the model for the total combined sample of 75 IDSs. Regarding strategic fit for the combined sample, hypothesis 1a, which stated that the strategic fit of IT integration/sophistication and interorganizational integration will have a significant influence on IDS quality performance improvement, was supported for patient days (b = -.118, t = 1.3043, p<.10) and mortality rate (b = -.120, t = 1.4300, p<.10). Although the direction of the relationship to admissions was also negative, it was not significant (b = -.101, t = 1.2206). Hypothesis 1b, which stated that strategic fit will have a significant influence on IDS financial performance improvement, was supported for the cost to charge ratio (b = -.181, t = 1.7909, p<.05). Support was not demonstrated for a negative relationship between strategic fit and operational cost (b = -.111, t = 1.2504) or ROA (b = -.053, t = 0.6475).

IT integration and sophistication. Hypotheses 2a and 2b regarded the relationship between IT integration/sophistication and both quality and financial outcomes. Hypothesis 2a, which stated that IT integration will have a significant influence on quality performance improvement, was supported for patient days (b = -0.135, t = 1.4981, p<.10), mortality rate (b = -.122, t = 1.5124, p<.10), and admissions (b = -.116, t = 1.4322, p<.10). Additionally, hypothesis 2b, which stated that IT integration will have a significant influence on financial performance improvement, was supported for

operational cost (b = -0.128, t = 1.4096, p<.10) and the cost to charge ratio (b = -.193, t = 1.7490, p<.05). The relationship between IT integration and sophistication and ROA was not supported (b = -.078, t = 0.8487).

Interorganizational integration. Addressing interorganizational integration, hypotheses 3a and 3b concerned the relationship between interorganizational integration and both quality and financial performance improvement. Hypothesis 3a, which stated that interorganizational integration will have a significant influence on quality performance improvement, was not supported for patient days (b = -.086, t = 1.1341), mortality rate (b = -.092, t = 1.1960), or admissions (b = -.072, t = 1.0120). Hypothesis 3b, which stated that interorganizational integration will have a significant influence on financial performance improvement, was supported for the cost to charge ratio (b = -.144, t = 1.5825, p<.10). Support was not demonstrated for a significant relationship between interorganizational integration and operational cost (b = -.082, t = 1.0748) or ROA (b = -.027, t = .3760).

Mediation. In hypotheses 4a to 4c, the idea of possible mediation between quality performance improvement and financial performance improvement was tested. With regard to hypothesis 4a, the link between IT integration and financial performance improvement exhibited full mediation, thereby lending support to this hypothesis (b = 0.945, t = 22.8394, p<.01). Hypothesis 4b was not supported. Because the direct relationship to the mediator variable was not significant in the interorganizational integration model, further testing for mediation was not necessary. Hypothesis 4c, which stated that the relationship between strategic fit and financial performance improvement

will be partially mediated by quality performance was supported (b = .919, t = 20.289, p<.01).

Mature Versus Immature Comparisons

Hypotheses 5a to 7b addressed the comparison of the model relationships between mature IDSs and immature IDSs. With a sample size of 33 mature IDSs and 42 immature IDSs, the path coefficients were compared for significant differences.

Strategic fit. Regarding strategic fit, hypothesis 5a stated that the strategic fit of IT integration/sophistication and interorganizational integration will have a significantly stronger influence on quality performance improvement in mature IDSs than in immature IDSs. This hypothesis was supported for mortality rate (b_m = -0.241, t = 1.5419, p < .10; b_i = -0.038, t = 0.3577) and admissions (b_m = -0.209, t = 1.4105, p < .10; b_i = 0.079, t = 0.7147). Support was not demonstrated for a significant difference in the relationship between strategic fit and patient days. Though a negative relationship was demonstrated for both mature and immature IDSs, neither was significant.

Hypothesis 5b, which stated that strategic fit will have a significantly stronger influence on financial performance improvement in mature IDSs than in immature IDSs, was partially supported for ROA. Though neither demonstrated a significant relationship between strategic fit and ROA, the path was positive for mature IDSs. Both exhibited significant negative relationships to the cost to charge ratio; but, the difference between the two was not significant.

IT integration and sophistication. Hypotheses 6a and 6b stated that IT integration and sophistication will have a significantly stronger influence on both quality and financial performance improvements in mature IDSs than in immature IDSs. Hypothesis

6a was supported for mortality rate (b_m = -0.246, t = 1.7083, p < .05; b_i = 0.072, t = 0.6309) and admissions (b_m = -0.218, t = 1.5137, p < .10; b_i = 0.051, t = 0.4897). Supported was not demonstrated for patient days. Regarding the relationship to financial performance, hypothesis 6b was supported for operational cost (b_m = -0.209, t = 1.4134, p < .10; b_i = -0.089, t = 0.7848) and ROA (b_m = 0.264, t = 1.3822, p < .10; b_i = -0.125, t = 0.8347). Support was not demonstrated for the cost to charge ratio.

Interorganizational integration. Interorganizational integration was addressed in hypotheses 7a and 7b. Hypothesis 7a, which stated that interorganizational integration will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs, was supported for mortality rate (b_m = -0.200, t = 1.5604, p < .10; b_i = -0.063, t = 0.7018) and admissions (b_m = -0.175, t = 1.5207, p < .10; b_i = 0.103, t = 0.9959). Support was not demonstrated for patient days. Though both demonstrated a negative relationship between interorganizational integration and patient days, neither was significant. Hypothesis 7b, which stated that interorganizational integration will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs, was supported for the cost to charge ratio (b_m = -0.312, t = 1.7741, p<.05; b_i = -0.086, t = 0.8339). Support was not demonstrated for operational cost or ROA. The results are summarized in Table 10 and presented graphically in Figures 9 through 16.

Table 10

Summary of Hypotheses Tests

	Hypotheses	Results
H1a	The strategic fit of IT integration/sophistication and interorganizational integration will have a significant influence on IDS quality performance improvement.	*Supported* Patient Days, Mortality Rate

H1b	The strategic fit of IT integration/sophistication and interorganizational integration will have a significant influence on IDS financial performance improvement.	*Supported* Cost to Charge Ratio
H2a	IT integration and sophistication will have a significant influence on IDS quality performance improvement.	*Supported* Patient Days, Mortality Rate, Admissions
H2b	IT integration and sophistication will have a significant influence on IDS financial performance improvement.	*Supported* Operational Cost, Cost to Charge Ratio
H3a	Interorganizational integration will have a significant influence on IDS quality performance improvement.	*Not Supported*
H3b	Interorganizational integration will have a significant influence on IDS financial performance improvement.	*Supported* Cost to Charge Ratio
H4a	The relationship between IT integration/sophistication and financial performance will be partially mediated by quality outcomes.	*Supported*
H4b	The relationship between interorganizational integration and financial performance will be partially mediated by quality performance.	*Not Supported*
H4c	The relationship between strategic fit and financial performance will be partially mediated by quality performance.	*Supported*
H5a	The strategic fit of IT integration/sophistication and interorganizational integration will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs.	*Supported* Mortality Rate, Admissions
H5b	The strategic fit of IT integration/sophistication and interorganizational integration will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.	*Partially Supported* ROA
H6a	IT integration and sophistication will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs.	*Supported* Mortality Rate, Admissions

H6b	IT integration and sophistication will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.	*Supported* Operational Cost, ROA, Cost to Charge Ratio
H7a	Interorganizational integration will have a significantly stronger influence on IDS quality performance improvement in mature IDSs than in immature IDSs.	*Supported* Mortality Rate, Admissions
H7b	Interorganizational integration will have a significantly stronger influence on IDS financial performance improvement in mature IDSs than in immature IDSs.	*Supported* Cost to Charge Ratio

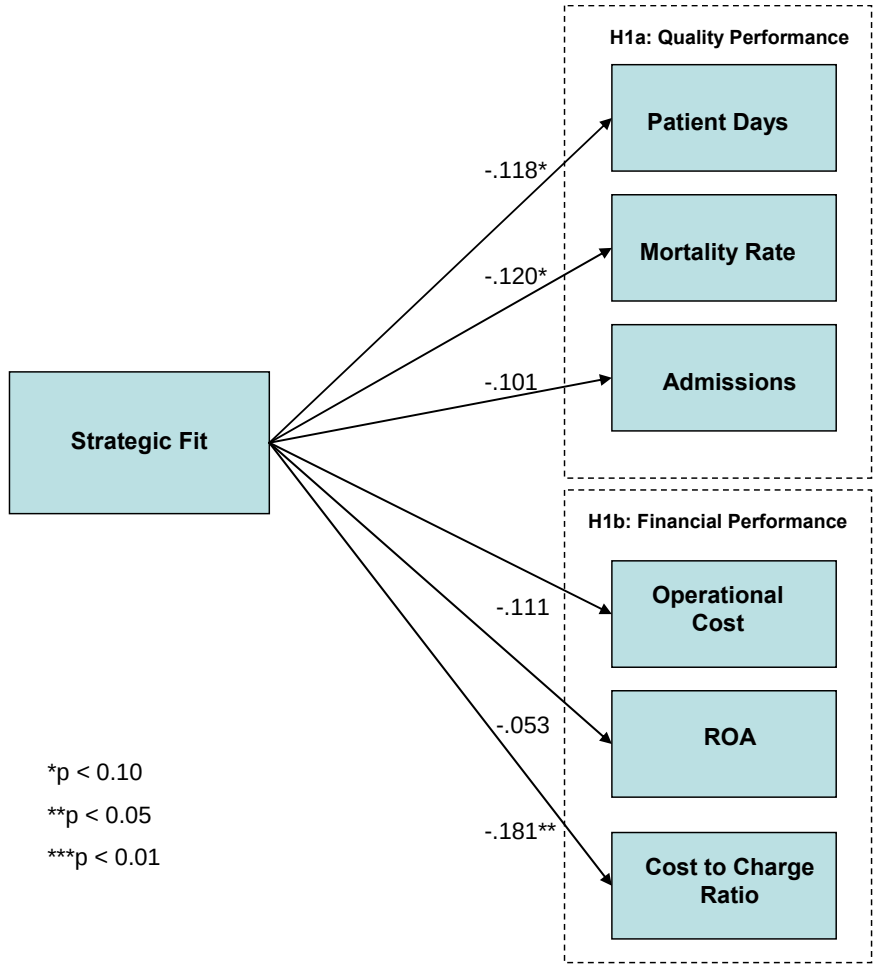

Figure 9. Model of strategic fit for full sample.

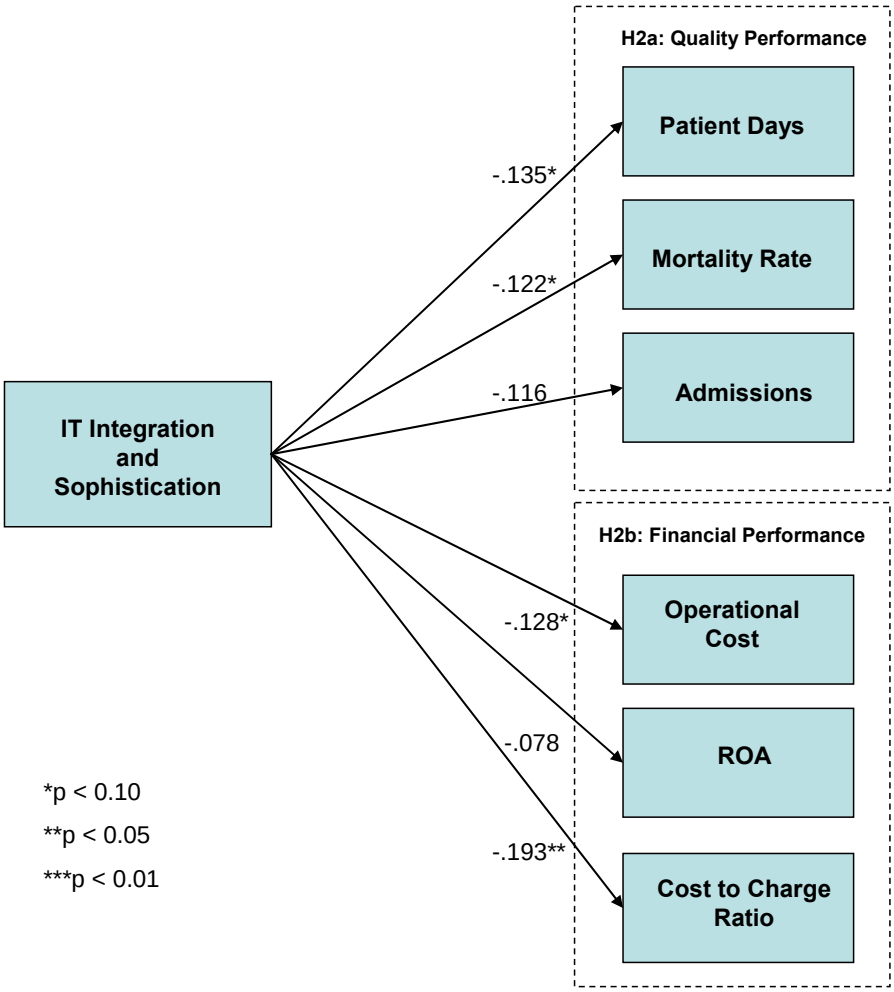

Figure 10. Model of IT integration and sophistication for full sample.

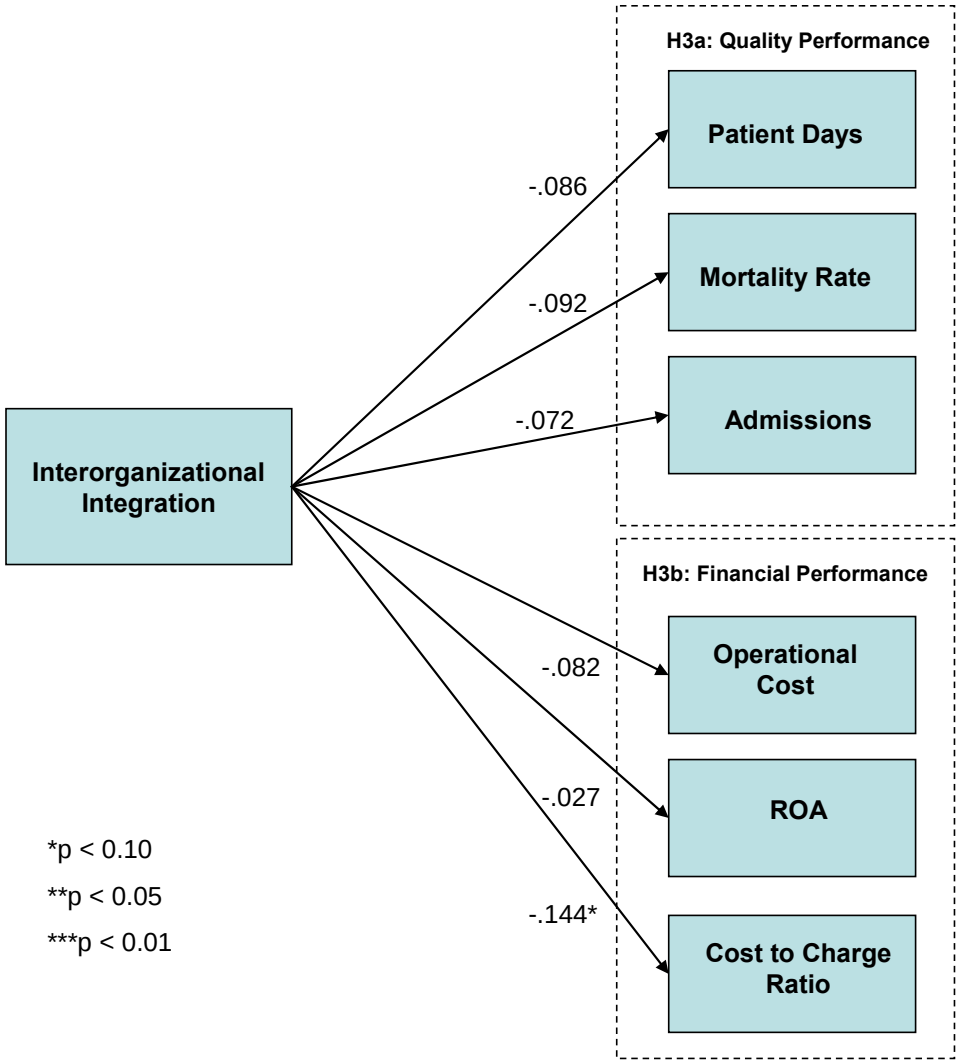

Figure 11. Model of interorganizational integration for full sample.

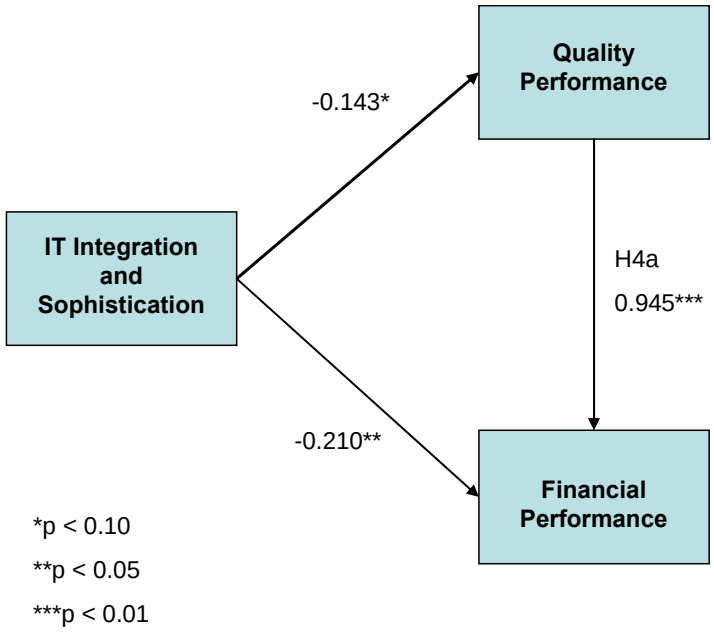

Figure 12. Model of mediation of IT integration and sophistication.

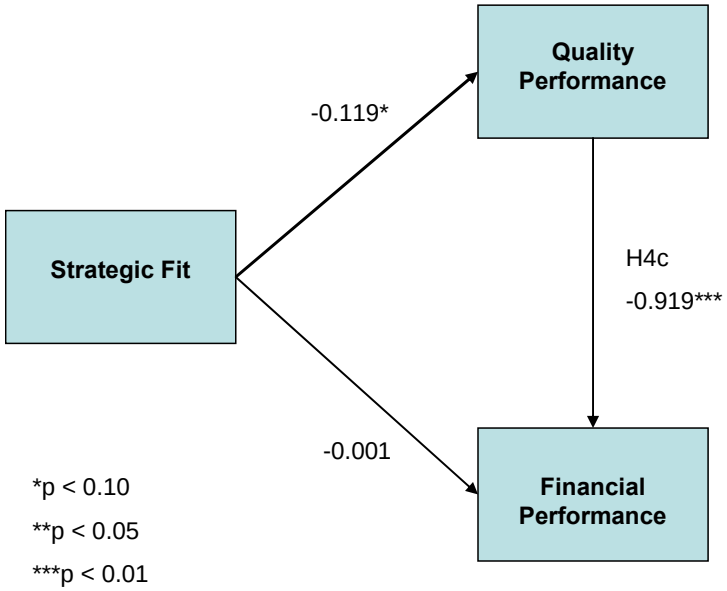

Figure 13. Model of mediation of strategic fit.

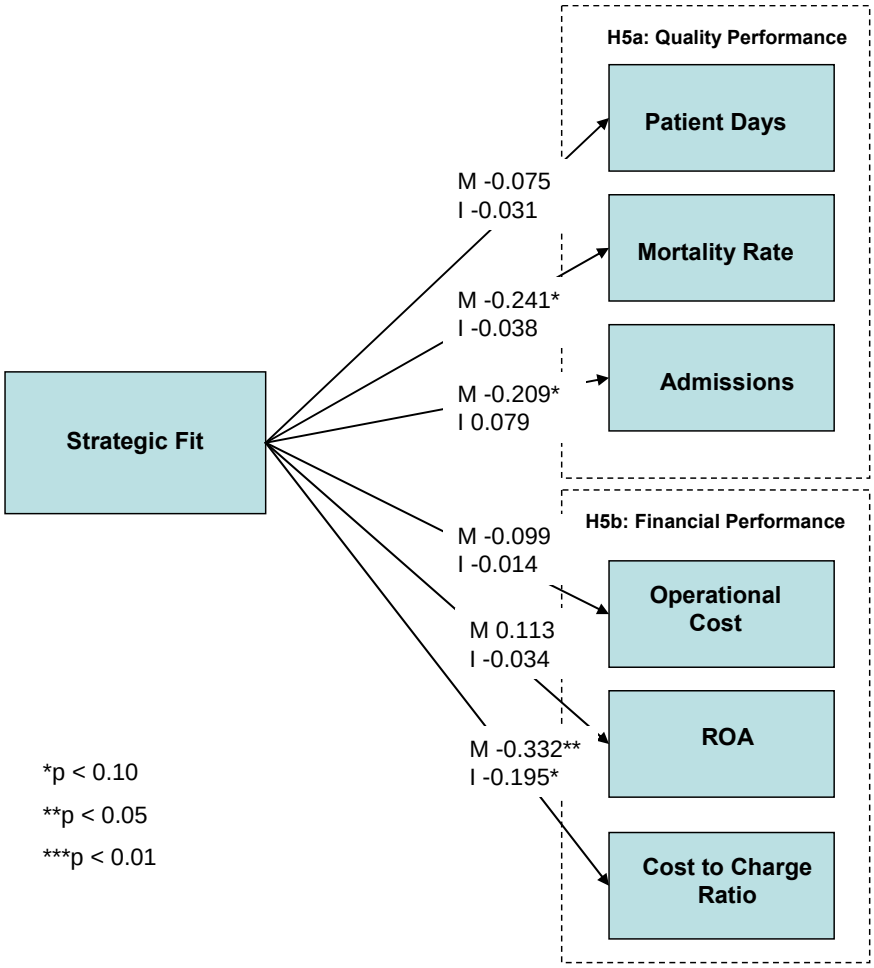

Figure 14. Model of strategic fit for mature and immature IDSs.

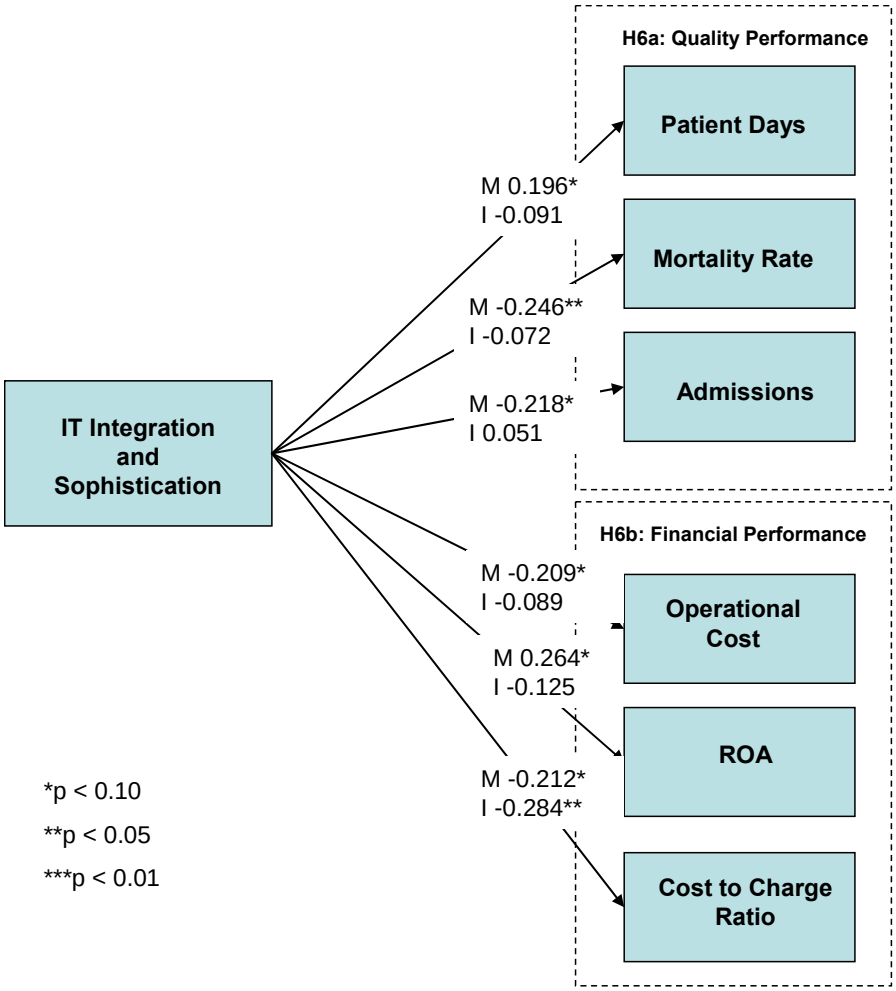

Figure 15. Model of IT integration and sophistication for mature and immature IDSs.

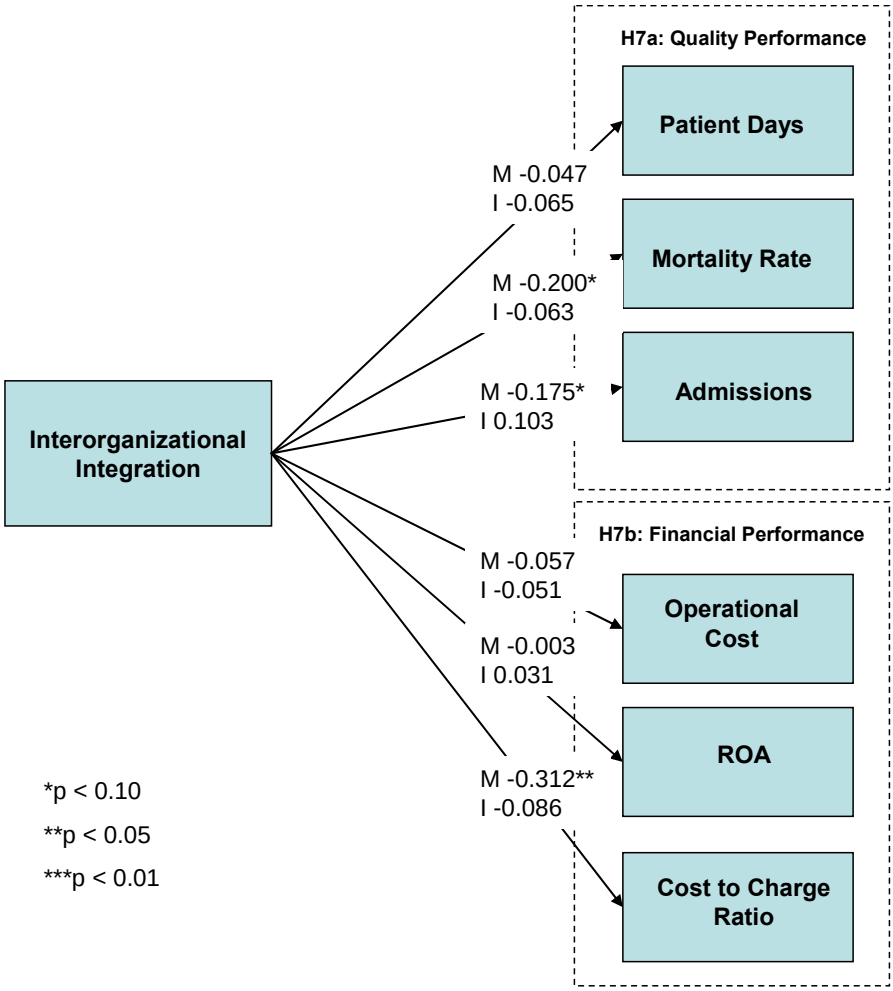

Figure 16. Model of interorganizational integration and sophistication for mature and immature IDSs.

CHAPTER V

DISCUSSION

Interorganizational networks are frequently being adopted in many industries as a means to improve performance and create competitive advantage (Payton & Ginzberg, 2001; Straub et al., 2004). These integrated strategic alliances form a type of value chain posited to enhance quality and financial performance for network participants (Alter & Hage, 1993; Payton & Ginzberg, 2001; Lapiedra et al., 2004; Straub et al., 2004). In particular, the need for interorganizational networks in health care has been predicted to continue to grow in response to new governmental policies and increasingly complex issues that should be more effectively addressed through tighter integration and coordination (Schumaker, 2002). The integration of business processes, functions, and tasks, enabled largely by IT, seems to be critical to interorganizational network success; yet empirical evidence of this relationship is lacking in the IT literature (Schumaker, 2002; Straub et al., 2004). Therefore, using the health care IDS as a distinct example of an interorganizational network, this study examined the relationship between strategic fit, formed by IT integration and sophistication and interorganizational integration, and both quality and financial performance. Patient days in the hospital, mortality rate, and hospital admissions were used as measures of quality appropriate for the healthcare industry (Dowling, 1997; Bates, 2002); ROA, operational cost, and the cost to charge

ratio represented financial performance outcomes (Devaraj & Kohli, 2000; Snyder & Paulson, 2002). The study then compared the results across two groups of IDSs, mature and immature, to investigate the argument that mature interorganizational networks should see greater benefits from strategic fit than immature networks. Primary survey data gathered from IDS CIOs was combined with secondary data from HIMSS Analytics and the American Hospital Directory to empirically test a model of strategic fit and its hypothesized relationships to quality and financial performance improvement.

This chapter examines the results of the study, as presented in Chapter 4, and offers additional discussion regarding these results. Implications of the study for practitioners are presented. The chapter concludes with limitations of the study and an agenda for future research.

Findings for the Full Sample

Strategic Fit to Performance

The first two hypotheses stated that the strategic fit of IT integration and sophistication and interorganizational integration would lead to improvements in both quality and financial performance. As such, these hypotheses were tested using the full sample of 75 IDSs. Support was demonstrated for a significant negative relationship between strategic fit and patient days in the hospital, mortality rate, and the cost to charge ratio.

While prior studies have demonstrated a significant relationship between strategic fit and quality in terms of IT effectiveness, user satisfaction, and other similar user-centered measures (Chan & Huff, 1993), the link to more customer-centered or patient-centered outcomes has been rare in the IT literature. However, regarding the health care

industry in particular, it is imperative that IT integration and sophistication, interorganizational integration, and the strategic fit of these factors be instrumental in furthering the best practices of medicine (Kilbridge, 1998). Thus, the present study has presented a different approach to the measure of quality performance through the use of objective, quantitative quality outcomes that may directly signify improvements in the practice of medicine. To that end, the results of the present study suggest that IDSs should see shortened hospital stays and fewer patient deaths as a result of achieving strategic fit between IT integration and sophistication and interorganizational integration. These represent critical improvements in patient care quality.

Similar to Chan and Huff (1993), support was not demonstrated for a significant link between strategic fit and ROA for the full sample of IDSs. However, in contrast to Chan and Huff (1993) and Palmer and Markus (2000), the present research also examined the relationship between strategic fit and reductions in cost. Support was demonstrated for a significant link between strategic fit and the cost to charge ratio. Because the cost to charge ratio is calculated based on total costs for the hospitals within the IDS, this represents a significant reduction in costs as a result of achieving strategic fit. These results seem to be more in line with the work of Zajac et al. (2000), who observed significant financial performance improvement in organizations that achieved advanced levels of strategic fit. In particular, these findings suggest that as IDSs successfully integrate and align their IT and organizational resources, this alignment should lead to significant reductions in cost, as represented by the cost to charge ratio. This finding is particularly important in light of the perceived inability to quantify the financial value of IT among many IDS administrators (Schumaker, 2002). Therefore, building upon the

firm-level research on strategic fit, these findings serve to reinforce the importance of achieving and maintaining strategic fit at the interorganizational network level of analysis, a perspective lacking in the IT literature (Straub et al., 2004; Simoens & Scott, 2005).

IT Integration and Sophistication to Performance

Hypotheses 2a and 2b predicted that IT integration and sophistication would have a significant impact on both IDS quality and financial performance. Support was demonstrated for both relationships. Specifically, IT integration and sophistication was linked to reductions in patient days in the hospital, mortality rate, and hospital admissions. Financial improvements in terms of reduced operational cost and the cost to charge ratio were also demonstrated as a result of IT integration and sophistication. Regarding the health care industry in particular, these findings are in line with prior research, which has suggested a significant reduction in both cost measures and hospital stay attributed to the use of IT and greater integration of IT resources (Tierney et al., 1993; Bates, 2002; Hamilton, 2004). As Tierney et al. (1993) and Hamilton (2004) point out, improvements in patient-centered measures such as patient days, mortality rate, and admissions should lead to a greater perceived quality of patient care, a primary goal of health care IDSs (Dowling, 1997; Laplante, 2005).

Additionally, these findings lend support to the firm-level evidence of other industries. For example, in their investigation of IT integration in the airline industry, Tapscott and Caston (1993) also found a significant relationship between increasing levels of IT integration and cost reductions. Thus, the findings of the present study further emphasize the need for continual efforts to increase and improve IT integration

and sophistication for greater interorganizational success, both in terms of quality and financial performance (Weiner et al., 2004).

Interorganizational Integration to Performance

Hypotheses 3a and 3b related to the effects of interorganizational integration on both quality and financial performance improvements. Support was demonstrated for a significant link between interorganizational integration and financial performance improvement, specifically in terms of reductions to the cost to charge ratio. Consistent with prior research at the firm level (Subramani, 1999; Frohlich and Westbrook, 2001), these findings suggest that as the business processes, functions, and tasks of the interorganizational network participants are increasingly integrated, costs should be reduced.

Contrary to the predicted results, the relationship between interorganizational integration and quality performance improvement was not supported. Perhaps the use of patient-centered quality outcomes as opposed to more user-centered operational outcomes contributed to these results. Given the young age of many of the IDSs surveyed, these networks may still be largely focused on organizational integration for business process improvement, as posited in the earlier stages of both the IT-Enabled Business Transformation Framework (Venkatraman, 1994) and the IT Integration Life Cycle (Weiner et al., 2004). Along those lines, interorganizational integration at earlier stages of development may be more likely to influence changes to measures of administrative and operational quality, as opposed to those regarding patient care. It should be noted, however, that the paths from interorganizational integration to patient

hospital days, mortality rate, and admissions were negative, suggesting that favorable progress is being made in this area.

A second possible explanation for the lack of support regarding interorganizational integration may be the high level of organizational complexity associated with newly formed and expanding IDSs (Coddington & Moore, 2001). These alliances are formed by the union of otherwise autonomous organizations, each with its own governance structure, business processes, assets, and resources. Thus, it is reasonable to suggest that simply the formation of an IDS and the resulting integration of the participating providers is insufficient to evoke sustained performance improvement. Instead, improvements may be more readily realized through IT integration and sophistication and through the strategic alignment of IT integration and interorganizational integration.

Mediation

Hypotheses 4a through 4c addressed the issue of probable mediation between quality performance and financial performance. More specifically, each of these hypotheses examined the possibility of an indirect link from strategic fit, IT integration and sophistication, and interorganizational integration to financial performance improvement through improvements to quality performance.

Mediation was supported for both strategic fit and IT integration and sophistication. Because the link between interorganizational integration and quality performance was not significant, testing for mediation in that scenario was not warranted. These findings suggest that increases in strategic fit may directly influence reductions in patient days in the hospital and mortality rate; in turn, these quality improvements will

lead to a reduced cost to charge ratio. Additionally, the benefits of IT integration and sophistication should result in direct reductions in patient days in the hospital, mortality rate, and admissions. These quality improvements will then bring about significant reductions in both operational cost and the cost to charge ratio. The results lend support to prior research on the mediation of IT's performance impact, suggesting that the financial value of IT is often more fully realized indirectly through service and product quality improvements as opposed to a direct relationship to cost measures (Barua et al., 1995; Chen & Zhu, 2004; Byrd et al., 2005).

Comparisons Between Mature and Immature Interorganizational Networks

Strategic Fit to Performance

Hypothesis 5a compared the strategic fit to quality performance relationship between mature and immature IDSs, and hypothesis 5b compared the strategic fit to financial performance relationship across the two groups. The relationship between strategic fit and reductions in mortality rate and admissions was significant for mature IDSs but not for immature IDSs. In other words, IDSs who successfully achieve strategic fit at a more mature level of IT integration and sophistication and interorganizational integration should expect fewer patient deaths and inpatient admissions than those at a lower level of maturity. In addition, although the link was not significant, mature IDSs demonstrated increases in ROA, suggesting favorable progress in that area.

These results support the idea of strategic fit as a dynamic process, as opposed to a static event (Henderson & Venkatraman, 1993; Venkatram, 1994). As suggested by a number of researchers (Henderson & Venkatraman, 1993; Sahberwal & Chan, 2001; Smith & Swinehart, 2001; Weiner et al., 2004), the ability of the interorganizational

network to achieve strategic fit at a more mature level of IT integration and interorganizational integration should result in greater performance benefits. However, this is not to suggest that strategic fit is unimportant in an immature network. On the contrary, as prior discussion has noted, strategic fit has been linked to both quality and financial performance improvements regardless of the level of network maturity, further emphasizing the importance of fit for any interorganizational network. Yet, these findings do suggest that a continued effort toward greater levels of IT and interorganizational integration and the strategic fit of these attributes should lead to even better quality and financial performance.

IT Integration and Sophistication to Performance

Hypotheses 6a and 6b stated that quality and financial performance for mature IDSs should be significantly greater than that of immature IDSs as a result of IT integration and sophistication. Regarding quality, support was demonstrated for reductions in mortality rate and hospital admissions. Financially, operational cost was significantly reduced and ROA was significantly increased in mature IDSs. IT integration and sophistication was measured using the factors of IT integration, IT planning, and IT modularity. These findings build upon the frameworks of Venkatraman (1994) and Weiner et al. (2004), who suggested that greater performance improvements should be observed as organizations achieve higher levels of IT integration and sophistication. Additionally, similar to the findings of Beaudoin and Bogaert (2003), those IDSs who pursue higher, more mature, levels of IT integration and sophistication should see greater reductions in the number of patient deaths, inpatient admissions, and operational cost than those at lower levels.

Authors across disciplines suggest the importance of using ROA, ROE, and other performance ratios as financial outcomes (Keats & Hitt, 1988; Robins & Wiersema, 1995; Shin, 2001; Peslak, 2003). Yet, ROA and other similar ratios have remained largely elusive in IT research. Recent studies have attempted to address this relationship, also failing to find a significant link between IT and ROA (Shin, 2001; Peslak, 2003). To the contrary, the findings of the present study suggest that mature IDSs indeed realize significant improvements in ROA as a result of achieving greater levels of IT integration and sophistication. This finding offers an important contribution to the IT literature and reinforces the need for continued efforts toward greater, more mature, levels of IT integration and sophistication.

Interorganizational Integration to Performance

The final pair of hypotheses compared the relationship between interorganizational integration and both quality and financial performance across mature and immature IDSs. Support was demonstrated for a significant relationship between interorganizational integration and mortality rate, admissions, and the cost to charge ratio in mature IDSs, but not in immature IDSs. In other words, mature IDSs tend to see greater reductions in patient deaths, hospital admissions, and the cost to charge ratio from successful interorganizational integration than do immature IDSs.

Kim (2000) and Beaudoin and Bogaert (2003) observed similar results, thereby concluding that greater levels of interorganizational integration should result in improved quality and financial performance. Mature IDSs seem to possess a greater level of cross-functional collaboration, communication, and business process integration. These attributes are more clearly linked to Business Network Redesign or Business Scope

Redefinition in the IT-Enabled Business Transformation Framework (Venkatraman, 1994), which posits that as organizations reach these higher levels of transformation, the performance benefits should be greatly enhanced over those remaining at the lower levels.

Implications

Since the early 1990's, health care organizations have actively formed IDSs with two primary goals of reduced costs and improved patient care quality. Researchers and practitioners alike have attributed much of the formation and expansion of these interorganizational networks to the employment of appropriate IT resources and innovations (Dowling, 1997; Boone & Maley, 2000; Weiner et al., 2004). To that end, health care administrators have tended to focus on the cost benefits of these arrangements as justification for further growth and expansion. Yet, others argue that these administrators must also consider the importance of improvements to patient care quality in their decisions (Beaudoin & Bogaert, 2003). Recently, however, many IDS administrators have expressed a hesitance to make additional expensive investments in IT given the pressures to control costs. In fact, some have begun to consider the possible dissolution of IDSs due to an inability to quantify the anticipated improvements in either quality or financial performance (Parker, 2001; Laplante, 2005); and these same concerns have been raised regarding interorganizational networks across other industries. Therefore, the results of the present study are timely and should aid in the justification of decisions by management to implement additional innovations, integration, and IT-enabled change within the interorganizational network.

The present study has demonstrated a number of important findings regarding interorganizational networks. Through the classification process, evidence of strategic fit among health care IDSs has been demonstrated. Networks are pursuing and accomplishing strategic fit, regardless of the level of network maturity. Additionally, the findings of the empirical model suggest that greater IT integration, interorganizational integration, and the strategic alignment of the two are important and necessary pursuits for the success of the IDS, regardless of the level of maturity achieved. These suggestions lend support to the arguments of researchers who have touted IT as one of the most critical enabling resources in the formation of interorganizational networks (Payton & Ginzberg, 2001; Melville et al., 2004; Straub et al., 2004). Therefore, with new expansion possibilities, services, regulations, and options for patient care, the IDS must strive even harder to achieve higher levels of IT and interorganizational integration and the strategic fit of the two (Korenchuk, 1997; Hsaio & Ormerod, 1998).

One important contribution of the present study is the use of patient-centered, objective measures of quality. The results of the present study suggest that IT integration in the health care industry serves not only to improve administrative processes, but also directly and favorably impacts the medical care of patients. Of those measures examined, health care administrators have identified mortality rate as the most critical measure of patient care quality, noting the importance of identifying innovations, techniques, and medical discoveries that can aid in reducing the number of patient deaths (Dowling, 1997). Thus, the results of the present study suggest that both IT integration and sophistication and strategic fit have a direct and significant influence on reductions in patient deaths. In addition, reductions in mortality rate were greater among mature IDSs

than immature IDSs. These results alone should spur the interest of IDS administrators and should serve as a catalyst to promote the diligent pursuit of increased IT and interorganizational integration.

Rogers and Lutz (2003) observed slowed or stalled progress in terms of the quality and financial performance benefits of IDS formation. To the contrary, the present study challenges the measurement of performance improvement, suggesting that IDS formation alone is insufficient to bring about noticeable change. It is rather the alignment of IT integration and interorganizational integration that affords IDSs the greatest performance improvement, both in terms of quality and financial performance. Furthermore, mediation suggests that IDSs must look closely at the quality to financial performance link to more effectively identify the source of improvement. The results indicate that both strategic fit and IT integration and sophistication have a direct influence on quality performance; in turn, these quality improvements lead to significant cost reductions. These quality and financial performance improvements are even further enhanced among IDSs who have achieved significantly higher levels of IT integration and interorganizational integration. Thus, as IDS administrators contemplate further investments in IT resources and tighter integration of the participating organizations, perhaps the empirical model and the associated results can aid in the justification of these investments.

Based on the findings and discussion of the present study, instead of dissolution, perhaps IDS administrators would be well-served to adopt a practice of continual dynamic innovation in terms of both IT resources and organizational functions and processes. Even where relationships were insignificant within the present study, these

links demonstrated a desirable path direction, suggesting the potential for greater benefit in the future. As the lag effect of IT suggests, the maximum quality and financial benefits of strategic fit may not have been maximized yet due to the young age of many of these networks (Barua et al., 1995; Byrd et al., 2005). Consider the argument of the lag effect which suggests that new IT investments may require at least two to three years to generate significant performance benefits. Then, allow ample time for IDSs to form and to integrate the IT and organizational resources of all network participants. This leaves very few years for the performance benefits to have materialized, particularly given the median age of 12 years (and mode of 8 years) for the IDSs participating in this study. In fact, Beaudoin and Bogaert (2003) suggest that within the health care industry, organizational transformations of the magnitude required by IDS formation and sustained by IT integration may take as long as five to seven years to produce tangible financial benefits. Yet, the results presented in this study are significant and favorable and should be even more prominent in the future, thereby encouraging IDSs to stay the course, to continue to pursue appropriate integration, and to exercise patience in terms of quantifying the benefits of these investments. The findings presented in this study should offer hope to IDS administrators and participants as they struggle with the decision to continue to integrate or instead to dissolve the alliances.

As IDS administrators make the choice to expand and integrate, they must recognize that neither the formation of the IDS nor the purchase of an ERP system is sufficient in isolation to bring about extensive improvements. As this study has demonstrated, IT integration includes the hardware and software, planning process, modularity and flexibility of the chosen solutions, and sophistication of the resources.

Thus, all aspects of IT integration must be adequately addressed if substantial improvement is to be achieved and sustained. Similarly, as participants join the IDS, the contract between providers is simply not enough to spawn performance improvement. Administrators must also encourage an atmosphere of effective communication, collaboration, and business process improvement among all network participants. The synergy brought about by sufficient attention to each factor of interorganizational integration is ultimately what brings about change and improvement.

Finally, an added benefit of reductions to the cost to charge ratio extends outward from the IDS to Medicare and Medicaid. These government agencies use the cost to charge ratio to determine the level of reimbursement agreed upon with the health care provider. As the cost to charge ratio is reduced, the amount of money paid out by Medicare and Medicaid is also reduced. This can be crucial toward the continued viability of these programs and the benefits these programs offer to those they support. Thus, the results of the present study also offer encouragement to health care payers and should be considered further in future studies.

Limitations

As with any research project or study, the results of this study must be interpreted in light of its limitations. First, strategic fit has been noted as a dynamic process rather than a static event (Henderson & Venkatraman, 1993). Thus, the use of a cross-sectional survey design may have limited the insight to be gained through a longitudinal study of strategic fit. In doing so, this study has presented a snapshot in time of strategic fit and its components across mature and immature IDSs. Second, the study employed a single year of financial and quality data. While the use of a single year of data is a common

practice in IT research, studies have indicated that the use of up to three years of data following the survey may be more effective in establishing an IT to performance relationship (Barua et al., 1995; Byrd et al., 2005). Regarding both of these limitations, future research of this type may consider using longitudinal data for both the independent and dependent variables to provide a more complete, detailed view of the strategic fit to performance relationship over time.

A third limitation regards the statistical power of the data analysis. Given the small sample size, especially with respect to the multigroup comparisons, the possibility of Type II errors exists. Although 12 out of 14 hypotheses were supported for at least some of the quality and financial performance outcomes, the possibility exists that other performance measures were falsely rejected. Future studies should consider the use of larger samples to overcome these concerns.

A final limitation is the generalizability of the results. The use of interorganizational networks from a single industry may hinder the generalizability of the study's findings. Nonetheless, particularly at the network level of analysis, much complexity of structure, governance, and form is often present even within a single industry, thereby increasing the difficulty of empirical studies of strategic fit at this level. To that end, the present study serves to form a foundation upon which to build a body of knowledge regarding the interorganizational network. Much investigation is needed across a number of industries to continue to build this stream of research.

Future Research

This study has presented and empirically tested a model of strategic fit for the interorganizational network. In turn, support has been demonstrated for significant

quality and financial performance benefits as a result of achieving strategic fit. In addition, isolated tests of IT integration and sophistication and interorganizational integration revealed significant quality and financial performance impacts when higher levels of integration are achieved, whether this integration is among the IT resources of the network participants or among the organizational processes of the participants. The model and associated results should serve as a foundation and catalyst for additional studies of the value of IT for interorganizational networks across other industries.

In the future, researchers may consider expanding the model to examine the potential relationship between IT integration and sophistication and interorganizational integration. For instance, if we assume that mature IDSs who have achieved strategic fit possess both a higher level of IT integration and sophistication and interorganizational integration, then these findings build upon the work of Subramani (1999) and Frohlich and Westbrook (2001), suggesting that greater organizational integration among network participants is often a result of appropriate use and integration of IT resources. Additionally, as posited by Venkatraman (1994), Rockart et al. (1996), and Bhatt (2000), IT may serve as the catalyst to spur new business processes, greater integration of business functions and processes, and even changes to the business structure. Similar to the work of Chan and Huff (1993) this study examined strategic fit and the realized level of maturity of the IDSs at the time of the study. Therefore, future studies should examine the dynamic nature of strategic fit and interorganizational maturity and the factors that create a potential dependence between the components of strategic fit.

While this study has examined the value of strategic fit for the interorganizational network, future studies might examine the differences in IT value for networks who have

achieved strategic fit versus those who have not. As researchers explore and build a stream of research around the interorganizational network, it is necessary to explore IT value from a variety of perspectives and scenarios to form a more informed body of knowledge. Finally, exploration of the proposed model and hypotheses is needed across other industries and in varying contexts to further refine the model, to examine a broader spectrum of interorganizational arrangements, and to lend to the generalizability of the study's findings.

More specific to the health care industry, quality measures such as mortality, length of stay, admissions, and costs will certainly continue to be important measures for additional investigation. However, a need also exists to explore the value of more complex treatments and procedures, which are largely enabled by IT but the results of which cannot be readily obtained from a database (Bates, 2002; Munsch, 2002). Further, as patients continue to take a more active role in their care, patient satisfaction with the information available to them electronically may also play a more significant role in studies of IT value to health care. Additional research will be needed to better assess this factor (Bates, 2002).

Conclusion

As firms in many industries continue to build and expand interorganizational networks, the structures, processes, and governance of these networks become increasingly complex. In turn, the need for strategic fit among the organizations and their resources gains importance for network success. Yet, network managers lack support for their decisions and their emphasis on investments in IT resources and organizational integration. In response to the calls for research at the interorganizational network level

of analysis, this study has presented and empirically tested a model of strategic fit for the interorganizational network, a perspective lacking in the IT literature.

Building upon three streams of research, namely strategic fit, IT integration, and organizational integration, this study has presented a model of strategic fit for the interorganizational network. Additionally, the quantitative results were compared across different levels of network maturity to examine possible differences in strategic fit impact as networks mature and evolve. This work has laid a groundwork upon which to build and extend interorganizational network research to other industries and across a variety of network types.

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APPENDICES

APPENDIX A

INFORMATION EMAIL

INFORMATION EMAIL
for Research Study Entitled
---Examining Strategic Fit for the Interorganizational Network: An Empirical Investigation of the Health Care Integrated Delivery System---

You are invited to participate in a dissertation research study to investigate the quality and financial performance impacts of strategic fit within the interorganizational network, specifically within the health care integrated delivery system. This study is being conducted by Evelyn Thrasher, PhD Student, under the supervision of Dr. Terry Byrd, Professor of Management at Auburn University. I hope to learn how the strategic alignment of IDS structure and IT resources impacts or improves the quality and financial performance of the IDS. In addition, I hope to learn how this impact may differ across IDSs at different levels of development. You were selected as a possible participant because you are currently the CEO or CIO of an active health care integrated delivery system and may be in a position to provide insight regarding the current level of IT and organizational integration within the IDS.

If you decide to participate, I will provide a link to an electronic survey instrument at the end of this email. You may simply click on the link to begin the survey. You will be asked to complete a series of questions regarding the current state of IT integration and organizational integration within the IDS. The survey will take approximately 15 minutes to complete, and you will be asked to complete only one survey. When you have completed the survey, simply press submit to send your electronic response.

You will be asked to provide the name of your IDS on the survey instrument, but you will not be asked to provide your name or title. This information will serve two purposes. First, it will allow me to match the survey responses for your IDS with additional financial and quality information available in the HIMSS Analytics Database and American Hospital Directory. Second, I will provide a summarized report of the survey results to all IDSs who choose to participate in this study. No IDS names will be included in the report; only aggregate data will be reported and analyzed.

The results of this study may provide insight to you and your IDS regarding the benefits of investment in IT resources and the achievement of alignment between the organizational and IT goals and resources of the IDS. You will receive a report describing the relationship between IT integration, interorganizational integration, and strategic fit to quality measures and financial measures. These performance measures will include, but may not be limited to, average length of hospital stay, mortality and morbidity, outpatient versus inpatient frequency, operational cost, clinical cost, and return on assets. I cannot promise you that you will receive any or all of the benefits described.

Any information obtained in connection with this study will remain anonymous. Information collected through your participation may be used to fulfill a dissertation requirement for the degree of PhD of Management at Auburn University, published in a

professional journal, and/or presented at a professional meeting. You may withdraw from participation at any time, without penalty. However, after you have provided anonymous information, you will be unable to withdraw your data after participation since there will be no way to identify individual information.

Your decision whether or not to participate will not jeopardize your future relations with Auburn University or the Management Department of Auburn University.

If you have any questions I invite you to ask them now by emailing me at thraseh@auburn.edu. If you have questions later, I can be reached at (508)910-9502 (thraseh@auburn.edu) or you may contact my faculty advisor, Dr. Terry Byrd at (334)844-6543. We will be happy to answer any questions you might have regarding this study or the information to be provided in the survey instrument.

For more information regarding your rights as a research participant you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone
(334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu .
.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, THE DATA YOU PROVIDE WILL SERVE AS YOUR AGREEMENT TO DO SO. THIS EMAIL IS YOURS TO KEEP.

IF YOU WISH TO PARTICIPATE, PLEASE CLICK ON THE FOLLOWING LINK TO ACCESS THE ELECTRONIC SURVEY INSTRUMENT:
http://www.surveymonkey.com/s.asp?u=365621801351.

Sincerely,

Evelyn Thrasher
Department of Management
Auburn University, AL 36849
(508)910-9502
thraseh@auburn.edu

APPENDIX B

SPONSORSHIP LETTER

On behalf of HIMSS Analytics, I am pleased to sponsor the graduate research of Mrs. Evelyn Thrasher, a doctoral candidate in Management Information Systems at Auburn University, Auburn, Alabama. Mrs. Thrasher is working under the direction of Dr. Terry Byrd, Professor of Management, Auburn University.

The demand for electronic medical records, greater information technology (IT) innovation, and integration of services and resources continues to grow across the health care industry. The goal of this study is to identify and quantify the impact to IDS quality and financial performance when an equivalent level of IT integration and organizational integration is achieved. Moreover, this study will examine how these relationships differ both in nature and strength across different levels of IDS development. In other words, can an IDS gain more benefit by achieving higher levels of IT integration and by further expanding and integrating the IDS organization?

Preliminary results of a pilot study have been favorable. Initial results suggest that average length of hospital stay and IDS operational costs may be reduced when IT resource integration is aligned with the organizational structure of the IDS. However, additional data is needed to further refine this study and to gain more detailed insight into the nature of these, and other relevant, performance relationships. For healthcare CEOs and CIOs, this research lends tremendous support to the efforts to quantify the value of IT for the healthcare organization and the integrated delivery system.

HIMSS Analytics recognizes the contribution and benefit of this research for the further advancement of IT in the health care industry. We encourage you to assist this effort through the completion of an electronic survey developed for this study. The survey will take only 15-20 minutes to complete, and a link to the survey will be provided by Mrs. Thrasher.

Summarized results of the study will be provided to HIMSS Analytics and all research participants. We believe this study will provide valuable insight for CEOs and CIOs as you continue to address the IT needs and issues of healthcare organizations and integrated delivery systems. Thank you for your support of this research project.

David E. Garets, President and CEO
HIMSS Analytics LLC

About HIMSS Analytics

HIMSS Analytics, a wholly-owned, not-for-profit subsidiary of HIMSS, supports improved decision-making for healthcare organizations, healthcare IT companies, and consulting firms by delivering high quality data and analytical expertise. Using accurate, timely, reliable data, HIMSS Analytics provides value-based solutions that lower cost, increase revenue, and improve operational and market performance for our clients.

APPENDIX C

SURVEY INSTRUMENT

Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

The purpose of this survey is to assess the level of strategic fit between information technology (IT) integration and interorganizational integration within your integrated delivery system (IDS). Please complete all sections by selecting the best response for each question based on your view of your IDS.

This survey should take only 10-15 minutes to complete.

Thank you in advance for your participation.

Next >>

Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

Section 1 of 7: Information Technology Integration

The questions below relate to IT INTEGRATION within your IDS.

Please select the best response for each question based on your view of your integrated delivery system.

1. Flexible electronic links exist between all organizations of the IDS.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

2. Our IDS utilizes open systems network mechanisms to boost connectivity.

Strongly Disagree	Disagree	Neither Disagree nore Agree	Agree	Strongly Agree
○	○	○	○	○

3. Our user interfaces provide transparent access to all platforms and applications.

Strongly Disagree	Disagree	Neither Disagree nore Agree	Agree	Strongly Agree
○	○	○	○	○

4. Data received by our IDS from electronic links (e.g. EDI, EFT) are easily interpretable.

Strongly Disagree	Disagree	Neither Disagree nore Agree	Agree	Strongly Agree
○	○	○	○	○

5. Information is shared seamlessly across our IDS, regardless of the location.

Strongly Disagree	Disagree	Neither Disagree nore Agree	Agree	Strongly Agree
○	○	○	○	○

6. Our IDS provides multiple interfaces or entry points (e.g. Web access) for external end users.

Strongly Disagree	Disagree	Neither Disagree nore Agree	Agree	Strongly Agree
○	○	○	○	○

<< Prev **Next >>**

Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

Section 2 of 7: Information Technology Planning

The questions below relate to IT PLANNING within your IDS.

Please select the best response for each question based on your view of your integrated delivery system.

1. A plan exists for IDS-wide information technology.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

2. Our information technology plan reflects business goals.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

3. An information technology steering team/advisory committee is active within our IDS.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

4. Senior management participates in the information technology steering team/advisory committee.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

5. Users participate in the information technology steering team/advisory committee.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

6. A formal methodology for information technology development is in place in our IDS.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

<< Prev **Next >>**

Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

Section 3 of 7: Information Technology Modularity

The questions below relate to IT MODULARITY within your IDS.

Please select the best response for each question based on your view of your integrated delivery system.

1. Reusable software modules are widely used in new systems development in our IDS.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

2. Our databases are able to communicate through many different protocols.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

3. The development of new applications is not restricted by legacy systems within our IDS.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

4. A common view of our IDS's patient data is available to all authorized personnel in the IDS.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

5. Data captured in one part of our IDS are immediately available to everyone in the IDS.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

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Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

Section 4 of 7: Cross-Functional Teams

The questions below relate to CROSS-FUNCTIONAL TEAMS within your IDS.

Please select the best response for each question based on your view of your integrated delivery system.

1. Our tasks are done through cross-functional teams.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

2. Our employees are assigned to work in cross-functional teams.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

3. Our employees are required to work in cross-functional teams.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

4. Our managers are assigned to lead cross-functional teams.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

5. Our most important tasks are carried out by cross-functional teams.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

<< Prev **Next >>**

Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

Section 5 of 7: Communication

The questions below relate to COMMUNICATION within your IDS.

Please select the best response for each question based on your view of your integrated delivery system.

1. Managers throughout our IDS communicate frequently.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

2. Employees throughout our IDS communicate frequently.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

3. Relevant work groups are quickly notified of strategic decisions.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

4. Employees across different levels of the IDS hierarchy communicate easily.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

5. Employees can easily meet and communicate with upper management.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

<< Prev **Next >>**

Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

Section 6 of 7: Collaboration

The questions below relate to COLLABORATION within your IDS.

Please select the best response for each question based on your view of your integrated delivery system.

1. Managers across IDS organizations collaborate to solve problems.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

2. Employees across IDS organizations collaborate to solve problems.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

3. Our IDS organizations partner with one another to address patient care needs.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

4. Our IDS organizations partner with one another to address operational needs.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

5. Our IDS organizations form a close relationship with the patient.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

<< Prev **Next >>**

Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

Section 7 of 7: Business Process Integration

The questions below relate to BUSINESS PROCESS INTEGRATION within your IDS.

Please select the best response for each question based on your view of your integrated delivery system.

1. Redundant administrative processes in our IDS are extremely low.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

2. The billing functions for our IDS are done at a centralized location.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

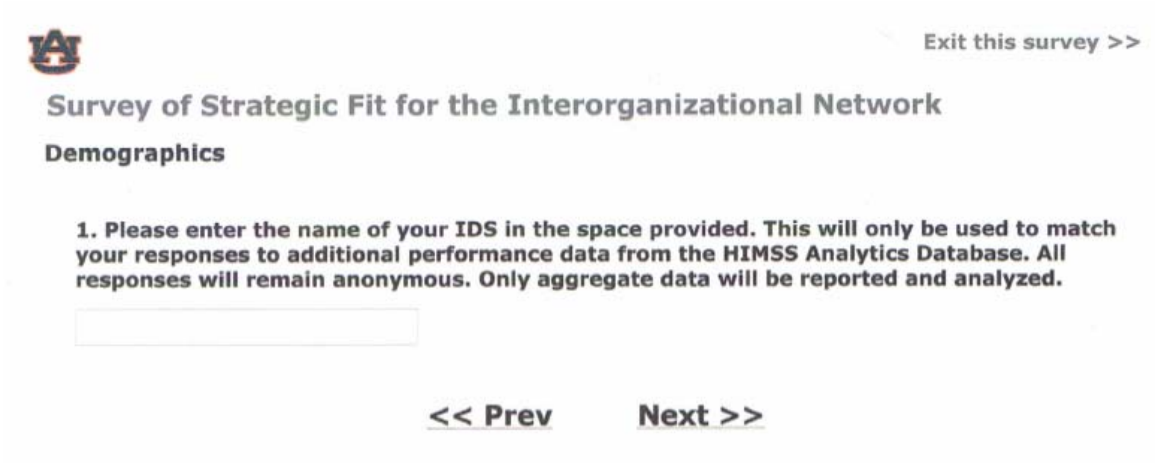
3. Most administrative tasks for our IDS are done at a centralized location.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

4. The patient registration functions for our IDS are typically completed at a centralized location.

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
○	○	○	○	○

<< Prev **Next >>**



Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

Demographics

1. Please enter the name of your IDS in the space provided. This will only be used to match your responses to additional performance data from the HIMSS Analytics Database. All responses will remain anonymous. Only aggregate data will be reported and analyzed.

<< Prev Next >>

Exit this survey >>

Survey of Strategic Fit for the Interorganizational Network

The survey is complete. Your input is greatly appreciated. My dissertation would not be a success without the generosity of individuals like you.

A summarized report of the survey results will be provided to all participating IDSs once the study has been completed and all data has been analyzed.

THANK YOU FOR YOUR PARTICIPATION!

<< Prev **Done >>**