

HOSPITAL ORGANIZATIONS AS COMPLEX ADAPTIVE SYSTEMS: A
CONFIGURATIONAL APPROACH TO EXAMINING COMPLEXITY
ADAPTATION IN ACTION AND IMPLICATIONS
ON ORGANIZATIONAL PERFORMANCE

by

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A DISSERTATION

Submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy in the Department of Management and
Marketing in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2008

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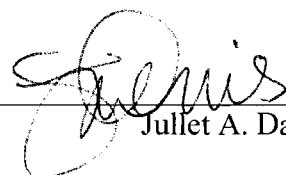
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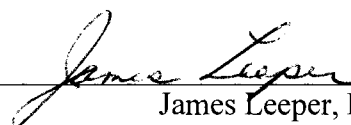
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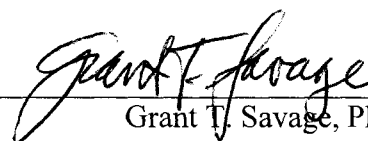
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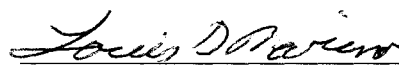
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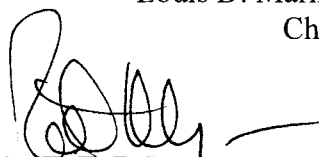

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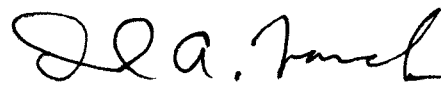

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LIST OF ABBREVIATIONS AND SYMBOLS

AHAG	American Hospital Association Guide
ANOVA	Analysis of Variance
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Composite Reliability
DRG	Diagnosis Related Group
EFA	Exploratory Factor Analysis
GFI	Goodness-of-Fit Index
HBR	Harvard Business Review
IT	Information Technology
NFI	Normed Fit Index
PCA	Principal Component Analysis
RMSEA	Root-Mean-Square Error of Approximation
SEM	Structural Equation Modeling
VIF	Variance Inflation Factor

ACKNOWLEDGEMENTS

As I complete the final stages of my doctoral training, I find myself thinking back on my entire graduate experience at the University of Alabama. Overall, I genuinely appreciate the unending encouragement, kindness, and support I have received from all of the faculty members throughout my training. The compassion of the faculty members is the main reason I have been able to reach this point in my training. Here I would like to express my sincerest thanks to all people who have lent support to me, although I know it is impossible to identify them all.

Above all, I would like to thank my doctoral program coordinator, Dr. Diane E. Johnson, for the opportunity to further develop and refine my skills as a researcher. Dr. Johnson has been immensely accommodating and nurturing over the course of my training. She has shown great patience, inspired me, challenged me, and allowed me to grow intellectually. I also have great admiration for Dr. Grant T. Savage as both a magnificent teacher and a devoted advocate for his students. I am sincerely honored to have had the privilege of working with and studying under such a selfless mentor and inspiring role model. Dr. Savage always gave me enough leeway to develop independent thoughts and hypotheses. I thank him for the hours he spent critiquing my research. For without him the research would not have been as fun, or nearly as through and complete as it is.

I extend my gratitude to Dr. Louis D. Marino, for his time, patience and numerous tough questions in instructing me how to refine the research ideas. His bold statements

have always made me think about my research more deeply and critically, and no doubt improved the quality of my research. I also owe my debt to Dr. Eric S. Williams, who has been a wonderful advisor and mentor, and has given me constant support and excellent guidance during my doctoral studies. I thank him for always making himself available whenever I came to him for recommendation letters or research questions. I am grateful to Dr. Juliet A. Davis for thorough, thoughtful, and encouraging critique of my research, and for providing me with the archival data I needed, and showing continued support throughout the whole study.

As being said, the current study was made possible due to the involvement of many people. I gratefully acknowledge and thank my other dissertation committee members Dr. Michael Hardin and Dr. James Leeper, for their interest in this project, and for allowing time in their busy schedules to assist me in the planning and completion of my doctoral research.

Outside my dissertation committee, a lot of people have offered their supports and collaboration that are indispensable for my research. I would like to acknowledge Dr. Marilyn Whitman, Dr. Leo van der Reis, Dr. William R. Frey and my West Texas A&M colleagues for their generous help.

Special thanks go out to my past and present fellow students. They all have made the time enjoyable. Particularly, Zhi Tang and Jintong Tang have been an excellent resource for any trivial questions I had about research. Their knowledge and wisdom I always found to be remarkable. Brian Nagy not only has had to put up with sharing office space with me, but has a lot had to deal with incessant questions and help me to crack the problems of studying and living abroad.

My family members have been a constant source of love and support. A great big thank you to my dear husband, Weiling Zhuang, for it was him that pushed me and inspired me even at the toughest of times. Over and over, his strength, optimism, integrity, loving heart, passionate zest for life, and commitment to our family's happiness and well-being have enabled me to keep my focus on positive aspects of life. Most of all he has attentively listened to all my concerns and anxieties that arose at different times during the process. We have shared many sacrifices to see this work come to fruition. I must also acknowledge the inspiration that I have drawn over the last few months from our yet unborn son. The first time I felt him kick inside my belly, I was sitting at my computer. The joy he has given me and the love I have for him is indescribable – the expectation of his arrival helped me “finish strong”.

Finally, I send my love and gratitude to my Mom, Dad, Brother, and Sister-in-law. My family has kept me balanced, and always given me a place to escape the demands of my academic endeavors. I thank them for teaching me so much about life and what is important and supporting me throughout my academic career.

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ABSTRACT

This paper proposes a configurational framework of an organization-environment interaction model by examining two different adaptation modes, respectively characterized as a conservative mode of strategic reactivity and an entrepreneurial mode of strategic proactivity. Specifically, we propose that organizations with two different adaptation modes will form distinct interactive relationships with the external environment. The relationship is particularly presented as the diverse patterns of linkages between adaptive behaviors at different functional levels (technical and managerial) and various environmental sectors (technical and institutional). We finally assume equifinality of organizational performance, with a conservative mode of adaptation emphasizing the cost side of effectiveness, and an entrepreneurial mode of adaptation focusing on the flexibility side of effectiveness.

Data collected from 99 Texas hospitals are analyzed. Data were split into three parts with equal percentiles to form unambiguously conservative and entrepreneurial groups. Thirty-eight cases with small average values in the upper percentile were used for the regression analysis of the conservative mode of adaptation. Thirty cases with large average values in the lower percentile were used for the regression analysis of the entrepreneurial mode of adaptation. The middle group was deleted as grey area. The two groups with 68 cases were compared to assess their financial performance and innovation capability.

The major findings are: (a) Conservative hospitals' internal technology sophistication is negatively related to the degree of technical environment turbulence. However, this relationship is moderated by organizations' self-perceived competence; the stronger the perceived organizational competence, the weaker the influence from the external technical environment. (b) In terms of the impacts from the institutional environment on conservative hospitals, the hospitals' market position (at the core or the periphery of the field) plays a more significant role in determining organizations' legitimacy orientation than the direct effects from the institutional environment. (c) Entrepreneurial hospitals' external exploring activities have a significant influence on organizations' internal maintenance and integration, which could be indicated by the full utilization of organizations' slack resource, and the employment and exploration of organizations' human capital.

The results and limitations are discussed; the implications for future research and practice are presented.

CHAPTER I

INTRODUCTION

Introduction to a Framework of Two Types of Adaptation Response: Conservative vs. Entrepreneurial

The central theme of organization theory is the dynamics between organizations and environments (Wholey & Brittain, 1989). Organizations are routinely viewed as dynamic systems of adaptation and evolution that contain multiple parts which interact with one another and the environments. Such a representation of organizations characterizes organizations as open and complex adaptive systems dependent on interactions with environmentally generated resources (Morel & Ramanujam, 1999). Correspondingly, with organization and environment sub-systems together making up a supra-system, the linkages between environmental variation and organizations' alignment activities may be understood through a number of complexity science principles: self-organization, emergence, and co-evolution. Self-organization refers to the spontaneous development of structures and forms of behavior in systems characterized by multiple feedback loops and dynamics. The result of self-organization is a function of the patterns of locally defined relationships among interactive adaptive agents, and interactions between organizational and environmental elements. Each adaptive agent seeks for a better position, a niche, in its local fitness landscape where it can prosper and survive. Complexity results from the adaptive behaviors of agents (Holland, 1995). The adaptive

behaviors further enact novel circumstances which continuously emerge in aperiodic ways (Miller et al., 2001). In such a supra-system, perturbations in environmental parameters could force changes in organizations' evolution. On the other hand, the proactive activities of some organizations can even alter environmental settings. The co-evolution of organizational reactivity and proactivity constitutes an adaptation picture of being both locally unpredictable and globally stable.

Two themes have dominated the development of the adaptation construct in previous research. Emphasis has been either on grouping or categorizing adaptation activities according to their orientation or on distinguishing organizational types according to the adaptation activities pursued (Carter, 1990). The strategic choice and population ecology schools are two well-established perspectives for understanding adaptation responses, with the former focusing on various organizational activities and the latter focusing on differing clusters of organizations. The strategic choice perspective looks at a transformational process in which organizations adapt to environmental change by restructuring themselves in an intentional, rational manner (Zajac & Kraatz, 1993; Fombrun & Ginsberg, 1990; Zajac & Shortell, 1989; Ginsberg, 1988; Thompson & Tuden, 1959). The population ecology perspective examines an evolutionary process of competitive selection in which the whole population of organizations adapts to environmental change, given that individual organizational adaptation is blocked by institutional inertia and resource specificity (Hannan & Freeman, 1977). Despite differing views about organizational inertia and, therefore, predicted outcomes, both perspectives make the same assumption about system dynamics: Environmental change is always the antecedent to organizational change. Organizations, either by strategic choice or by

environmental selection, react to environmental variation, and a deterministic relationship is implied between the environment and the structure / strategy of an organization (Stacey, 1995). This constrained system view of organization-in-its-environment, to some degree, exaggerates environmental determinism, ignores the potential effects from organizational behaviors, and confuses two possible adaptation responses of conservative mode as strategic reactivity and entrepreneurial mode as strategic proactivity. It has been observed that while some organizations are good at exploiting the value of their proprietary assets, rolling out existing business models quickly, and taking the costs out of existing operations, some other organizations can move faster and beyond the volatile markets by being nimble, innovative, and proactive. For example, Finland's Nokia Corporation is trying out a vast array of new mobile technology offerings in addition to its dominant handsets franchise (O'Reilly & Tushman, 2004). GlaxoSmithKline Plc is experimenting with alternative organization models, alliance partners, and technologies in search for new blockbuster drugs while also pushing hard to maximize the return from its existing drug portfolio (O'Reilly & Tushman, 2004). Instead of waiting to act as a late responder, these organizations move beyond and even lead the volatile markets. Therefore, we believe that previous research almost entirely ignores one possible adaptation response through adaptive agent's self-organization and emergent legitimacy, and the possibility of co-existence and co-evolution of diverse adaptation responses. This study is thus designed to systematically investigate the diverse adaptation responses of different types of organizations and to present a whole picture of two types of adaptation responses characterized by being either conservative or entrepreneurial, hence establishing a solid foundation for building the adaptation literature.

According to Tuominen, Rajala, and Moller (2004, p. 496), “the basic assumption of studies on adaptability is that firms act either in response to environmental changes or to create their own environments.” In other words, adaptability can be demonstrated either through conservative and reactive behaviors or by entrepreneurial and proactive behaviors. The former are conceptualized as organizational responses to environmental stimulants; the latter assumes the proactive role of organizations to control a situation by causing something to happen rather than waiting to respond to it after it happens (Miller & Friesen, 1984). This typology parallels Meyer’s (1982) conceptualization about adaptation. Meyer uses adaptation to refer to two forms of organizational adjustments that both involve some understanding of action / outcome causal links. Deviation-reducing adaptation occurs when there is understanding within a given framework, a given set of organizational norms; organizational factors are adjusted to be in accordance with the environmental requirements. Deviation-amplifying adaptation involves the creation of new causal relationships built on a new base of assumptions. Meyer (1982) attributes these types of adaptation to different levels of learning. Chakravarthy (1982) notes similar points by demonstrating that a distinction needs to be made between strategic actions triggered by changes in the external environment and a “strategic structure” that addresses the question: How do we configure the resources of firm for effective responses to unanticipated surprises? Consistently, Miles and Cameron (1977) describe three different adaptive practices: (1) absorbing noxious or threatening environmental elements by complying with environmental mandates; (2) forecasting or anticipating environmental events so as either to restructure for them in advance or to prevent their occurrence; (3) adapting the environment to the firm’s preferred goals and

modes of operation. The first one falls into the conservative mode of adaptation, and the following two fall into the entrepreneurial mode of adaptation.

Following similar logic, we propose that organizations can act as either conservative / reactive or entrepreneurial / proactive entities in their interactions with the external environment. We define a broad meaning of adaptation response as a behavioral mode to survive the changing conditions of external environment and a process to achieve an effective organization-environment alignment. Particularly, adaptation response concerns the organization-environment interface; the types of behavioral responses encompass two separate components, being either conservative as strategic reactivity or entrepreneurial as strategic proactivity. Our typology about the organizations' adaptation modes can find its contextual cases from marketing literature, where marketing scholars talk about market-driven versus market driving approaches to examine different organizations' market orientation.

A Configurational Approach to a Framework of Two Types of Adaptation Response

We employ a configurational approach to address how organizations, as complex adaptive agents, interact with the external environment, and how the interactions constitute a complex picture of mutual adaptation. This configurational approach to adaptation is rooted in general systems and open systems perspectives (Zeithaml, Varadarajan, & Zeithaml., 1988). These perspectives view the organization as a social system composed of interdependent subsystems. Coordination within these subsystems is accomplished through management policies and practices, which in turn interact with the environment to help achieve a set of goals or objectives (Luthans & Stewart, 1977). Interactions within the organization and between the organization and the environment

result in two complementary open system characteristics that are central to the configurational approach: adaptation and equifinality (Zeithaml, Varadarajan, & Zeithaml, 1988).

Several theorists have argued that multivariate configurations of environment and organizational processes may offer useful or complete explanations for the complex process of organizational adaptation (Hambrick, 1985; Miller, 1987). Environmental and organizational configurations or gestalts represent an elaboration or extension of contingency approaches into multivariate combinations that express complex interrelations which may have strong predictive power (Dess, Newport, & Rasheed, 1993). A configurational approach typically posits higher effectiveness for organizations that resemble one of the ideal types defined in the framework. The increased effectiveness is attributed to the internal consistency among the patterns of relevant contextual, technical, structural, and strategic factors.

We build our configurational framework strictly following Doty, Glick, and Huber's (1993) three steps for developing valid quantitative models of configurational theories. First, the organizational configurations identified in the theory are conceptualized and modeled as ideal types. Second, a model of interactive relationships among the patterns of relevant contextual, technical, structural, and strategic factors is developed. Third, a performance implication of equifinality is derived and integrated with the model of interaction that assumes multiple effective ideal types of organizations.

Specifically, we propose two ideal types of adaptation mode: a conservative mode of adaptation as strategic reactivity and an entrepreneurial mode of adaptation as strategic proactivity. In order to comply with the core thesis of the configurational

theory (Doty, et al., 1993), rather than treating organizational configurations as nominal groups, we interpret the configurations as ideal-type adaptation modes. This interpretation has at least two implications for the empirical investigation. First, each ideal type is singular and discrete phenomenon rather than a nominal category. Consequently, any formal statement or empirical test of a configurational framework should not rest on simple classification but should involve a much richer, multivariate approach to defining the ideal types. Second, each organization in a sample need not be classified into one of the nominal groups identified in the framework. Instead, the degree of deviation between each real organization and the ideal types is measured. This deviation measure can then be used to predict organizational effectiveness in that organizations that marginally resemble the types are predicted to be much less effective than organizations that closely resemble them.

While previous dominant adaptation models emphasize either grouping adaptation activities or categorizing organizational types according to the adaptation activities pursued (Carter, 1990), our configurational framework integrates these two themes. First, we identify two ideal adaptation modes. We then contrast between the conservative mode of reactive adaptation and the entrepreneurial mode of proactive adaptation, where the former is triggered by external changes and the latter is inspired by inherent motivation. Second, we conceptualize adaptive responses as sets of activities diffused across different levels of an organization, and propose a measure of where in an organization adaptation is likely to occur. The principle of adaptation holds that organizations may adapt their structure, strategy, and technical activities to cope with changes in the external

environment, and address the unique requirements of the organization as dictated by its overarching characteristic, either a conservative or an entrepreneurial mode of adaptation.

Different levels of an organization constitute distinct organizational subsystems, each with different though interdependent subgoals, unique tasks and functions to be performed, and different structures and processes for organizing their activities (Van de Ven & Morgan, 1980). Various theorists, including Parsons (1956) and most notably Thompson (1967), have proposed formulations that specify the nature of adaptive responses and the level within the organization at which adjustments are likely to be made.

Parsons (1956), in his functional analysis of organizational adaptation to the environment in larger social systems, is the first to recognize explicitly three major levels of the organization: the institutional, the managerial, and the technical. Parsons defines adjustments in initiating or maintaining activities connected with external entities as the prerogative of an organization's institutional level. Alternations in the procurement and allocation of scarce resources occur at the managerial level; changes in how inputs are transformed into services or products occur at the technical level. Thompson (1967) elaborates the technical level further with his notion of the "technical core". He asserts that organizations wish to buffer or "seal off" these technical cores from the uncertainties and contingencies posed by the external environment. They do this through a variety of mechanisms, including environmental assessment and involvement of "boundary spanning" personnel, whose job is to manage external dependencies and protect the technical core so it can do its work efficiently.

Following similar logic, we differentiate the functional orientation of adaptation activities, and examine the nature of adaptive responses at different levels of an organization. The use of such hierarchical levels (e.g., managerial vs. technical) to discriminate adaptation responses is consistent with the division of labor, or structural differentiation within organizations (Blau, 1972; Meyer, 1972). However, it is doubtful that a substantive distinction can be made between institutional and managerial activities. Instead, these two sets of activities, both of which involve administrative actions, are more likely to merge in a general managerial category. Therefore, following Carter (1990), the relevant distinction of different levels of adaptation response is between responses that involve managing (the managerial level) and those that involve transforming inputs into outputs (the technical level). This functional perspective contrasting managerial and technical activities parallels Daft's (1985) proposition that organizations are composed of an administrative and a technical core, each with its own subenvironments. In particular, our technical level of adaptation response looks at the technology configuration in an organization and its variations over time; our managerial level of adaptation response focus on the internal consistency of patterns between organizational structure and organizational strategy. Organizations are assumed to consciously modify their alignment to the environment in a way of adapting technology, organizational structure, and business strategic processes (Tuominen, et al., 2004).

Conceptualizing adaptive responses as sets of activities diffused across different functional levels in an organization also accommodates a multidimensional perspective on environment. While early models tend to view environments as aggregates having a generalized influence on organizations (Carter, 1990), an emerging tenet in

organizational research is that environments are multidimensional and pose varying sources of ambiguity for organizations (Ungson, James, & Spicer, 1985; Dess & Beard, 1984). Therefore, to avoid obscuring some complex and contradictory effects of some potential influential factors, we further distinguish between technical and institutional sectors of the external environment (Scott & Meyer, 1983) with attention to the different sources of influential forces on organizational adaptation. Technical environments “are those within which a product or service is exchanged in a market such that organizations are rewarded for effective and efficient control of the work process” (Scott & Meyer, 1983, p.40). Technical environments call attention to technologies, resource streams, information flows, and influence relations (Tsai, MacMillan, & Low, 1991).

Organizations operating in technical environments are rewarded for effective control of the work process and are expected to concentrate attention on control and coordination of technical processes, buffering these processes from environmental disturbances. Most manufacturing organizations function primarily in technical environments. Xerox or IBM, for example, allocate a large share of their resources to improving production methods, developing new products, using labor more efficiently, and ensuring adequate coordination and control over their complex production, sales, and research activities. These efforts are aimed at realizing greater efficiencies and productivity – outcomes that are rewarded in technical environments by increased profits and larger market share. Xerox and IBM also work to protect their production units from uncertain or disruptive environmental influences, including variable sources of raw materials and fluctuations in demand.

In contrast, institutional environments “are characterized by the elaboration of rules and requirements to which individual organizations must conform if they are to receive support and legitimacy” (Scott & Meyer, 1983, p.149). Institutional environments call attention to symbols, cognitive systems, and normative beliefs (Tsai, MacMillan, & Low, 1991). Institutional environments feature elaborate rules and requirements to which individual organizations must conform if they are to receive support and legitimacy. Attention is directed away from control and coordination of technical processes and toward conformity to externally defined requirements or regulations. Public schools and welfare agencies are typical of organizations operating in institutional environments. Unlike technical environments, the environments of these organizations do not recognize or reward effective or efficient production. Public schools do not receive direct support contingent on increasing knowledge of their students. Instead, they are evaluated broadly in terms of having an appropriate curriculum, certified teachers, and an academic structure that conforms to the external specifications of the school district or state board of education.

Hospitals are examples located in the cell characterized by the combination of relatively strong technical and institutional environments. Hospitals are subject to strong institutionalized pressures, including a broad array of governmental regulations and requirements. They are also influenced by numerous professional specifications that govern what types of personnel may be hired, how tasks are distributed among them, and what procedures must be followed in performing these tasks. At the same time, hospitals operate in a highly technical environment. Although they are not directly rewarded for high quality (e.g., patients experiencing better outcomes do not pay more for their care),

patients and physicians make quality assessments that affect their decision to use one hospital in favor of another. The threat of malpractice suits and the required use of tissue committees and pathology reports are examples of other performance pressure. Also more than most other areas of professional practice, such as law, education and religion, medicine is driven for scientific and technical developments in which efficacy can be verified. The technical requirements of modern medicine are considerable (e.g., the requirements of modern surgery) and often demand tight internal controls and careful coordination if performance is to be effective. Finally, hospitals are being increasingly subjected to pressures for improved efficiency in the use of resources. Prospective payment systems, such as DRG (Diagnosis Related Group) formulas, are the most recent example.

Table 1-1 lists examples of organizational types associated with varying environmental conditions.

Table 1-1: Organizational Types Associated with Varying Environmental Conditions

		Institutional Environments	
		Strong	Weak
Technical Environments	Strong	Hospitals; Banks; Defense contractors	Retail goods manufacturers; Research firms; Information processing services (software)
	Weak	Public schools; Welfare agencies; Churches	Cleaning / laundry services; Shoe repair shops; Barber shops; Restaurants

The recognition that an environment has various sectors and categories, each of which may differentially impact an organization, suggests that linkages between specific sources of environmental variation and particular realignment activities can be

established. Therefore, we develop a model of organization-environment fit by examining interaction patterns between contextual and organizational factors. Specifically, we propose that organizations with two different adaptation modes will form distinct interactive relationships with the external environments. The relationship particularly presents as the diverse pattern of linkages between adaptive behaviors at different functional levels and various environmental sectors. That is, organizations with a conservative mode of adaptation will enact adaptation of different functional levels passively; the alternation of alignment activities is encouraged by challenges and threats resulting from corresponding sources of environmental variation. In contrast, organizations with an entrepreneurial mode of adaptation tend to move boldly and regularly; different functional levels engage in consistent changes. As a result, organizations' adaptive behaviors inspired by internal motivation may restructure or even create new environmental settings.

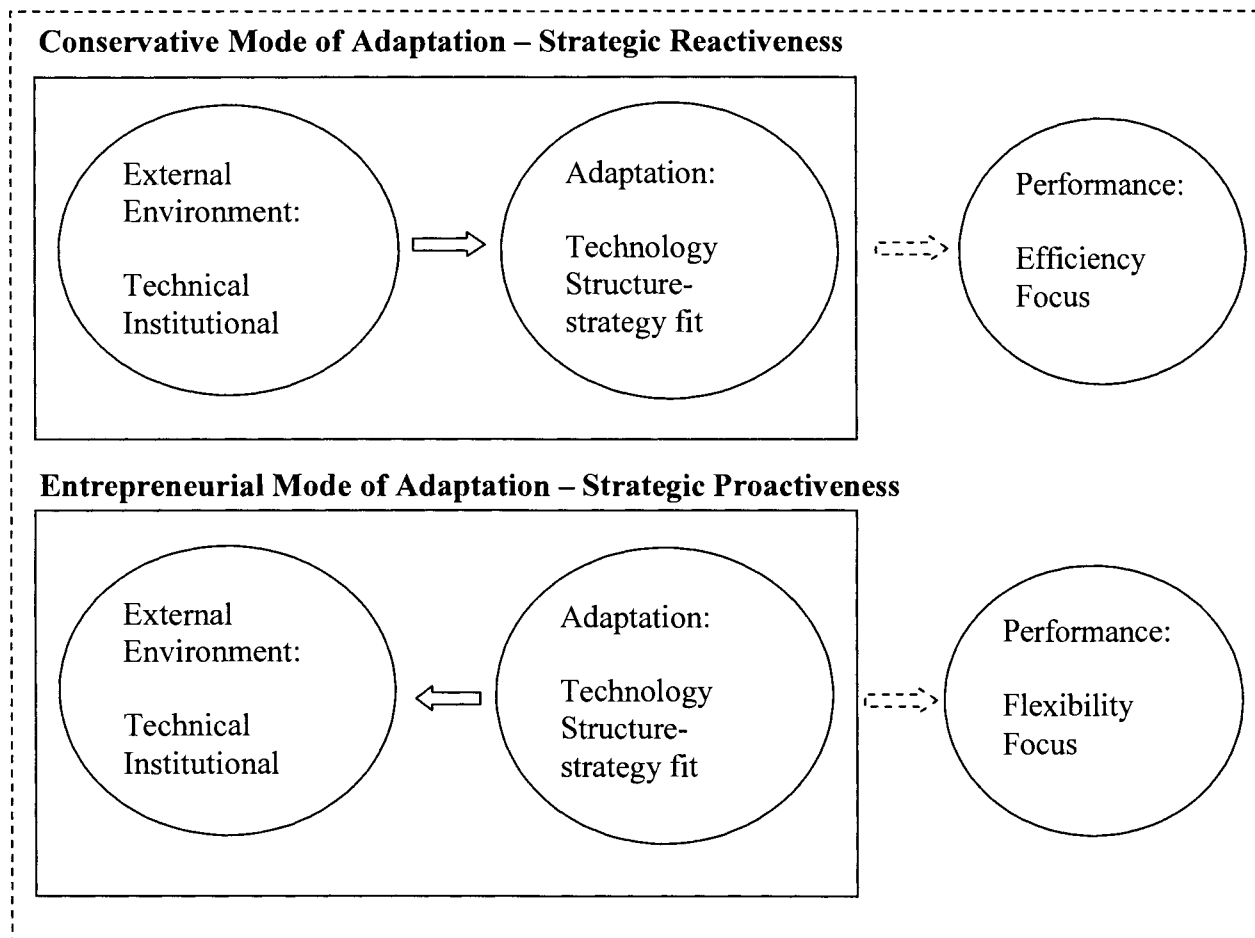
Finally, we assume equifinality for performance implication. Katz and Kahn point out (1978, p.335) that "a system can reach the same final state (e.g., the same level of organizational effectiveness) from differing initial conditions and by a variety of paths." This equifinality assumption allows a feasible set of equally effective, internally consistent patterns of context and structure (Van de Ven & Drazin, 1985). Particularly in our research, we propose that both a conservative mode of adaptation and an entrepreneurial mode of adaptation will contribute to the organizational effectiveness. This proposition is consistent with our observations that organizations with different adaptation modes (i.e., either conservative mode of adaptation or entrepreneurial mode of adaptation) do co-exist in the same industry (Karagozoglu & Brown, 1988), and both

types of organizations survive the turbulent environment and even thrive over time. Additionally, we believe that a complete evaluation of organizational effectiveness involves at least two aspects of consideration. One aspect focuses on the cost side of organizational activities, and refers to the accomplishment of a maximum output with a minimum expenditure of time and effort; another aspect emphasizes the flexibility side of the organization, and the organizational capability to deal with unexpected environmental events. As organizations with a conservative mode of adaptation tend to react with a defensive posture after environmental shifts, their performance tends to be superior on the cost side of organizational effectiveness with the emphasis on efficiency. In contrast, organizations with an entrepreneurial mode of adaptation tend to keep consistent change in an aggressive posture; their performance tends to be superior on the flexibility side of organizational effectiveness.

To summarize, we propose a configurational framework of organizations' adaptation response. Specifically, we identify the co-existence of two types of adaptation responses: a conservative mode of adaptation as strategic reactivity and an entrepreneurial mode of adaptation as strategic proactivity. Following Carter (1990), we further conceptualize adaptive responses as sets of activities diffused across managerial and technical levels in an organization. This conceptualization also accommodates a multidimensional perspective on environment as indicated by distinguishing between technical and institutional sectors of the external environment. Consequently, the examination of two types of adaptation response is collapsed into the different interactive relationships between organizations' adaptation activities of different functional levels and the various environmental sectors. We finally assume equifinality of

organizational performance resulting from the two adaptation responses with a conservative mode of adaptation emphasizing the cost side of effectiveness, and an entrepreneurial mode of adaptation focusing on the flexibility side of effectiveness. Our research framework is presented as Figure 1-1.

Figure 1-1: A Configurational Framework of Adaptation Responses



Research Setting: Hospital Organizations as Complex Adaptive Systems

Although both organizations with either conservative posture or entrepreneurial posture can be found in the majority of the industries, some industries are predominated by one type of organization. Examples of industries that are dominated by entrepreneurial firms are boat building, plastics, and pollution control; examples of others that are unique

to conservative firms are drugs, distilling, apparel manufacturing and automotive parts (Miller & Friesen, 1982; Karagozoglu & Brown, 1988). In this study, we chose hospital organizations as our research setting for following reasons. First, this industry demonstrates a relatively balanced distribution of both types of organizations; such rough split can be between non-profit and for-profit hospitals, or between non-specialty and specialty hospitals. Second, hospital organizations, characterized by professional dominance, are greatly influenced by advances in the medical technology of the field. At the same time, hospitals operate in highly institutionalized environments that put substantial pressures on both their technical and managerial components. Therefore, the features of the hospital industry fit into our configurational environment framework and allow the examination of the interactive relationships between organizations' adaptation activities of different functional levels and the various environmental sectors.

Researchers have identified some significant changes that have occurred in both the nature of hospitals and in their relation to their environments (Stevens, 1989; Burns, 1990). Particularly, significant changes are related to the periodical transition that hospital organizations have experienced since 1945 (Ruef & Scott, 1998). The first period is featured as professional dominance combined with localized controls; this is followed by vastly increased federal involvement in both the funding and regulation of hospital care. Currently, hospital organizations display increased reliance on market mechanisms and on managed competition.

Although the concept of adaptation is well integrated into "street knowledge" and has been examined conceptually and analytically, our research differs from the empirical work that exists in several ways. While early research pervasively entails the assumption

of organizational adaptation as a response to environmental changes which pose either opportunities or threats to the organizational survival, we offer a more comprehensive model of adaptation, and a richer presentation of these organization-environment interactive relationships. Particularly, we propose a reciprocal impact direction, with the premise of both environment-driven and environment-driving activities implemented by organizations with different modes of adaptation in the health care industry.

To the best of our knowledge, this is one of the early attempts to develop a comprehensive framework to examine how hospital organizations may behave differently in the face of challenges in technical and institutional environments. This study provides a perspective to view this issue by suggesting a configurational framework of organizational adaptation responses. The topic is important to managers and regulators who desire a better understating of the intended and unintended mutual effects between external environments and organizational adaptation. In the case of hospitals, adaptive responses affect not only the cost and quality of the hospitals' products and services, but also the composition of the industry itself, as evidenced by the emergence of shared services, consolidations, and mergers, and the continued growth of multiunit hospital systems.

Within this important domain, our study makes two contributions. First, we fill a knowledge gap by providing empirical support for theorized links among the various adaptive behaviors at different organizational levels and the distinct segments of technical and institutional environments. We empirically test interactive relationships and the enactment influences in a direction from organization to the environment as a result of an entrepreneurial mode of adaptation. Second, we introduce to the adaptation

literature and hospital administration literature a method for testing relationships involving the simultaneous assessment of multiple interrelated variables. We demonstrate that this configurational method provides researchers with a way to empirically assess relationships involving complex, multidimensional phenomena that is more consistent with the holistic framing of strategic management theory than are traditional approaches (e.g., Meyer, Tsui, and Hinings, 1993).

Organization of the Dissertation

The dissertation is organized as follows. Chapter I provides a brief introduction to the conception of the research framework, and the purpose and contribution of the dissertation, and presents an overview of the research method.

Chapter II is the literature review and model development section. In this chapter, a configurational framework of hospital organizations' adaptation behaviors is explored. Specifically, two sets of exploratory models are developed to address the interactive relationships between the environmental sectors and organizational variables, based on the adaptation nature of the organizations characterized by being either conservative or entrepreneurial. One set of models demonstrates how organizations with a conservative mode of adaptation implement induced adaptation as a result of environmental shift with the purpose of maximum efficiency; another set of models illustrates how organizations with an entrepreneurial mode of adaptation enact or even create environments by persistent change-related activities and resource allocation for the pursuit of optimal flexibility. The above relationships are conceptualized as interactions between sets of activities diffused across managerial and technical levels in a hospital organization and the technical and institutional sectors of external environments. Equifinality of

organizational performance is assumed by stating that conservative organizations excel on the efficiency side of effectiveness, while entrepreneurial organizations excel on the flexibility side of effectiveness. Hypotheses are formulated and their rationales are presented accordingly.

Chapter III is the methodology section. This study uses a cross-sectional design to investigate the relationships between our focus constructs. Data are collected from two sources. First, mailing surveys are distributed to hospital administrators and chief medical officers of major general medical and surgical hospitals in the Texas area, and result in 112 responses. Second, primary data are matched with archival data to check for the information regarding hospitals' financial performance, their membership and accreditation status, and other control variables. Measures are employed from previous research or developed based on parallel disciplines. The validity of these measures is verified before statistic analyses. Hypotheses are tested and results are presented.

In Chapter IV, a general discussion of the hypothesized relationships and conclusions and implications drawn from the study are presented, along with the limitations and future research directions. This study is important to hospital managers and health care regulators who desire a better understanding of the intended and unintended mutual effects between external environments and organizational adaptation. Hospital organizations' adaptive responses affect not only the cost and quality of the hospitals' products and services, but also the composition of the industry itself, as evidenced by the emergence of shared services, consolidations, and mergers, and the continued growth of multiunit hospital systems.

CHAPTER II

LITERATURE REVIEW AND MODEL DEVELOPMENT

Conservative and entrepreneurial categories of organizations are not new to strategic management research. This categorization is generally based on an identification of various strategic postures (Miles & Snow, 1978; Mintzbergs, 1973). For example, firms specializing in highly standardized products and pursuing cost-minimization strategies can be categorized as conservative organizations (Karagozoglu & Brown, 1988). Other firms, whose dominant strategies emphasize diverse products with the latest technological features and rapid product innovation, can be called entrepreneurial organizations (Karagozoglu & Brown, 1988). However, early research only emphasizes the profound effects of external environments on organizational change, and implies the antecedent role of environments in the organizations' adaptive activities. Such views ignore organizations' inherent motivation for change and internal impulse toward growth.

Following Tuominen, Rajala, and Moller (2004), we propose that the basic assumption of studies on adaptability should contain that firms act either in response to environmental changes or to create their own environments. Miller and Friesen (1980) further show that momentum is a pervasive force in organizations, and that past practices, trends, and strategies tend to keep evolving in the same direction. The same might be true of organizations' adaptation mode. While the initial adaptation mode is often determined by executives on the basis of their goals and temperaments (Miller & Friesen,

1982), organizations with a propensity to be conservative or entrepreneurial may continue to drift in the same direction until passing the point of dramatically diminished return, and thus reinforce the formation and persistence of the adaptation modes of contrasting features. Some early research touches on the perspective that two distinct adaptive behaviors can be identified to distinguish between organizations characterized by defensive orientation, emphasizing efficiency, avoiding risk, and performing innovation reluctantly, mainly in response to serious challenges and threats, and organizations that are aggressive or proactive, emphasizing flexibility, and implementing high degrees of innovation and risk taking.

Predominant literature has described the first type of adaptive behavior using a biological metaphor that relies on an algorithm of optimization of a fit function (Morel & Ramanujam, 1999). Just as organisms respond to the stimuli they receive, organizations adapt to environmental stimuli through technological activities reconfiguration, strategy reorientation, and structure adjustments. Changes in the conditions of the environment create both new opportunities and threats to organizations. These changes may alter the congruence between organizational configurations and environments, and press organizations to make a change. Suggestions have been made concerning suitable strategic choices under different environmental conditions (e.g., Dess & Beard, 1984; Miller, 1987b; Russel, 1995).

Three strands of thought seem to relegate “management” to a reactive-adaptive prison of deterministic circumstances. First, organization theory evolved to the point that the embracing of open-systems perspectives led to the vogue of contingency theories that posit “one best way” for each of various circumstances (Kast & Rosenzweig, 1974) and

to population ecology models of organization survival based on environmental fit (Aldrich, 1979). In this view, the right combination of organizational design variables, matched with particular environmental states (e.g., turbulence), will yield superior performance. The tradition of industrial organization economics is similar: industry structure (e.g., concentration ratio) combines with aggregate firm conduct (combination of factors of production) to yield some level of industry profitability. Application of this view to the individual firm level has led to studies attempting to indicate which combination of environmental and firm-specific variables will yield superior performance. Third, policy analysts say that policies are really formed through an incremental and/or political process and that attempts at rational planning are futile (Braybrooke & Lindblom, 1970). This school suggests that the limits to human and organizational rationality relegate the policymaker to the role of reactor, exploiting openings as they occur amidst the furor of political maneuvering in order to make incremental steps toward some goal.

To follow the dicta of most of these schools, one suggests that, as a way of inherent reductionism, organizations exploit contingencies as they arise, and resign themselves to succumbing to the matrix of deterministic forces presented by technical, institutional, and human forces that impinge on the freedom of choice.

We derive our insights toward the second type of adaptive behavior from some early classical literatures. For example, Penrose (1968) observes that for some organizations, recognition of opportunities takes place in the mind of managers and is often independent of changes in the external environment. As a result, Penrose forebodes the concept of “enacted environment”, and emphasizes the internal impulse toward growth. Levitt (1960), in his quintessential HBR (Harvard Business Review) article,

“Marketing Myopia”, addresses the feasibility of continued change and growth by urging organizations to broadly define their business and even their industries to take advantage of growth opportunities. Thus, in marketing terms, organizations should not be constrained by the seemingly saturated market; instead, organizations must be viewed as a customer creating organism, and should literally ascertain and act on their customer environment. A real case of this behavior can be found in the statement of Michael Dell, founder of a major computer firm: “The only constant thing about our business is that everything is changing. We have to take advantage of change... We have to be ahead of the game” (Narayandas & Rangan, 1996, p.1). Furthermore, the direct influence of industrial organizations in shaping their own environments was the central theme of John Kenneth Galbraith’s *New Industrial State* (1967). Galbraith dismissed the “myth of the systems... in which the market is a force of transcendent power” (p.356). Instead, the market is steadily being replaced by organizational behaviors, in which output, prices, and consumer demand is increasingly under the control of the corporations. It is contended that the top management or dominant coalition always retains a certain amount of discretion to choose courses of action that serve to coalign the organization’s resources with its environmental opportunities, and to serve the values and preferences of management.

Therefore, it is possible to consider a reciprocal causation among external (contextual factors) and internal (structural, strategic, power, and resource distribution) factors. Particularly, we propose that, given a snapshot of a certain period of time, organizations manifest themselves with one certain mode of adaptation, either conservative or entrepreneurial. For organizations with a conservative mode of adaptation,

the causal relationship will be stronger from environmental factors to organizational factors; for organizations with an entrepreneurial mode of adaptation, the causal relationship will be stronger from organizational factors to environmental factors.

To place this study in a larger theoretical context, the two adaptation modes should be linked to related concepts that are commonly employed in the literature on organizational and/or strategic change. Among these related concepts are business strategy typologies proposed by Miles and Snow (1978). Miles and Snow develop a comprehensive framework that addresses the alternative ways that organizations define and approach their product-market domains and construct structures and processes to achieve competitive advantage in those domains. Miles and Snow identify four archetypes of how organizations address these issues: (1) “Prospectors” continuously attempt to locate and exploit new product and market opportunities; (2) “defenders” attempt to seal off a portion of the total market to create a stable set of products and customers; (3) “analyzers” occupy an intermediate position by cautiously following prospectors into new product-market domains while protecting a stable set of products and customers; and (4) “reactors” do not have a consistent response to the entrepreneurial problem. In terms of strategic posture, organizations with an entrepreneurial mode of adaptation are more like prospectors, and organizations with a conservative mode of adaptation can be a mixed entity of defenders, analyzers, and reactors. Despite some overlap in certain strategic posture, our two modes of adaptation are distinguished from the general business strategy typologies in that the former implies a permanent disposition of the organization as driven by the pervasive momentum force in the organization; the mode of adaptation thus directs the overall adjustments at different

functional levels to a newly transformed environment. Certain practices, trends, and strategies tend to keep evolving in the same direction, characteristic of certain mode of adaptation, perhaps eventually reaching dysfunctional extremes (Miller & Friesen, 1982). In contrast, the general business strategy typologies proposed by Miles and Snow center only on strategy reorientation; strategy formulation can be a temporary approximation to this state of affairs, and can temporally coincide with the external environment change. In general, two modes of adaptation equal a much broader conceptualization than four typologies of general business strategy.

This study explores a configurational framework of organizations' adaptation behaviors. As the adaptation involves the interactive relationships between the environmental and organizational variables, we believe that the manner and even the directionality of such relationships will differ based on the conservative or entrepreneurial nature of the organizations. Specifically, we develop two sets of exploratory models to address the interactive relationship. On the one hand, consistent with the strategic choice perspective, we demonstrate how some organizations implement their induced adaptations in response to serious challenges or threats, and label this the conservative mode of adaptation in the study. On the other hand, we propose the positive role and autonomous adaptations of some organizations, and their organizational attempts to enact or even create environment; we label this as the entrepreneurial mode of adaptation. As the health care industry, specifically the hospital organizational community, could provide sufficient cases for the examination of the co-existence of organizations with either adaptation mode, we choose hospital organizations as our research setting. We detail our framework development as follows.

Conservative Mode of Adaptation as Strategic Reactiveness

The literature on adaptation, although fraught with conflict, seems to point preponderantly to a conservative model of adaptation. Basically, the model implies that change is not a natural state of affairs, and that it must be encouraged by external challenges and threats. The emphasis or objective of organizations with a conservative mode is on smooth, efficient, and regular functioning. Such organizations try to buffer themselves from external environments and to function with a machine-like harmony. Organizations implement change and adaptation as a result of environmental shift. A conservative model of adaptation examines both organizational resistance to change and factors that generate reversals in the direction of adaptation at two functional levels: technical and managerial.

Induced adaptation by the technical environment

Two features characterize changes in the technical environment. One is the emergence of new and complex technologies, and the resulting reformation of the work process; another is the change of product preferences and the demands for the new services. Management theorists and public policy researchers agree that technology advances have major social and economic consequences. Particularly in the organizational field, most of the organizational studies during the last several decades have tended to show that there are integral relationships between technical environment and organizational variables. Changes in the variables will tend to occur together, or will follow one another after a brief interval, in order to maintain an appropriate balance or alignment (Miller & Friesen, 1980). Miller (1980) has argued that such multivariate interdependencies tend to manifest *gestalts*, which are common configurations of

mutually reinforcing elements of environment, structure, strategy, and other organizational factors. Miller provides evidence for these gestalts and claims that they represent integrated, self-perpetuating alignments among a complex of variables across environmental, technical, and managerial levels.

A consistent finding in the early adaptation literature is that external technical uncertainties affect the level of change by conservative organizations (e.g., Pierce & Delbecq, 1977; Ettlie, 1983). There are at least two possible response mechanisms in managing the external technical uncertainties. One is that organizations respond to the overly turbulent technical environment by simplifying their technology structures (Downey & Slocum, 1975), due to the immature technological standards of the industry and the difficulty of forecasting the technological environment. However, this simplicity-response technique may be challenged by an increasing threat to organizational competence or long-term viability due to the changes in the technical environment. Therefore, increased turbulence may eventually stimulate organizational change characterized by an increased range and frequency of opportunity-seeking and strategic adaptation in order to resolve the issue of external threats, especially when the organizational competence to retain reasonable profits is hampered by the environmental change. In the health care background in particular, technology is changing the industry in a way that new technology makes newer, better, and faster service available and correspondingly creates new patient bases and attracts the old ones that accept such new practices. Meanwhile, the advancement in the technical environment also poses threats to the existing clinical routines.

The direct impact from the technical turbulence of the environment is on the technology configuration of the organization. Particularly, such influence may touch on the configurational features of organizational technology such as technology nonroutineness, technology heterogeneity, and technology interdependence in a way that updated technology structure may occur to achieve appropriate balance or alignment with the increased technical turbulence of the environment. Technology nonroutineness reflects the newness and uniqueness features of the technology; technology heterogeneity addresses the diverse composite categories of the organizational technology; technology interdependence assesses the functional linkages between different technologies, or if the proper function of one technology depends on the existence or the proper function of another type of technology.

In the case of hospital organizations, we distinguish the technology at the individual level from the technology at the larger organizational level. Particularly, in this study we use technology in reference to the information technology (IT) application and the use of related medical equipment. Information Technology (IT) refers to the collective means of assembling and electronically storing, transmitting, processing, and retrieving words, numbers, images, and sounds (Gerstein, 1987). IT's importance as a source of sustainable competitive advantage stems from its potential to impact the transformation of a service organization's value chain (Porter, 1990). IT can aid in attaining an sustainable competitive advantage by (1) providing organizations new ways to outperform rivals, through lowering costs and/or enhancing differentiation; (2) building barriers to entry, building switching costs, and sometimes completely changing

the basis of competition; and (3) spawning entirely new businesses (Porter & Millar, 1985).

Clinical IT application in healthcare has been believed to be linked with numerous organizational benefits (Menachemi, Burkhardt, et al., 2006), and serves as a prime example that hospitals are turning to new structures and processes to address external challenges and to survive in competitive markets (Jaana, Ward, et al., 2006). We assess technology at the organizational level to differ from the professional skills and medical expertise that are only held by individual professionals, as the stock of professional expertise may vary with the employee turnover, and cannot serve as a stable measurement of organizational technology.

For hospital organizations, the features of technology nonroutineness, technology heterogeneity, and technology interdependence can be assessed by “clinical IT sophistication”, a comprehensive instrument developed by Paré and Sicotte (2001) to capture the level of hospital innovativeness with regard to clinical IT applications. Paré and Sicotte identify clinical IT application in hospitals along three dimensions: (1) functional sophistication, referring to the computerization of various clinical and administrative processes and activities; (2) technological sophistication, referring to the extent of use of specific technologies in different areas in a hospital; and (3) integration level, reflecting the level of internal and external integration of various systems and technologies.

While previous literature shows that, in response to the environmental shift, organizations intend to make a change in order to remain viable, the ability of organizations with conservative mode of adaptation is subject to serious barriers. Miller

and Friesen (1980) have stressed in their momentum theory that organizations generally exhibit inertial tendencies and stubborn adherence to their prior strategies. Rumelt (1974) has found that managers frequently develop an emotional attachment to the organization's traditional strategic positions. In a similar vein, Duncan (1973, p.276) has stated, "the very process of developing stability in organizational functioning prevents the system from having flexibility to adapt when situations change." Particularly, when the technical environment becomes increasingly turbulent over time, and the increasing uncertainty makes market prediction and precise decisions on the technology configuration tougher and even unavailable, given their defendant and conservative traditions, conservative organizations tend to hold onto to their previous practice in order to be safe, as long as the organizations' perceived competence holds at the satisfactory level. Thus with the increasing turbulence in the technical environment, hospitals with a conservative mode of adaptation can become excessively risk averse, feel reluctant to change, and maintain the status quo as long as their organizations' perceived competence is at satisfactory levels. However, as environmental change results in the declined perception of organizational competence such as a dramatically diminished return, and new requirements for organizational viability, hospitals will have to respond and adjust their technological configurations. Therefore, we consider perceived organizational competence as a salient moderating factor influencing the conservative organization's adaptive process in face of the technical turbulence of environment, in a way that the higher the perception of organizational competence, the stronger the negative relationship between the technical turbulence of environment and conservative hospitals' technology reconfiguration. We thus propose:

H1: The technical environment turbulence is negatively related to clinical IT sophistication in hospitals with a conservative mode of adaptation. Particularly, this relationship is moderated by the hospitals' perceived competence in the following way: The higher the perceived organizational competence, the stronger the negative relationship between the technical environment turbulence and hospitals' clinical IT sophistication.

At the managerial level, the above alignment mainly refers to the structure adjustment and strategy reorientation, and the goodness-of-fit that exists between the organizational structure and the strategy style. The organizational structure and strategy style variables as a result of organization-environment alignments include the mechanistic-to-organic dimension of organization structure and the planning-to-improvisation dimension of organization strategy style.

Organizations' structure configurations involve decisions as to the level of centralization of decision making power, the level of standardization or formalization of organizational activities, the hierarchy of authority chains of organizations, and the distribution of professionalism and expertise shared in an organization. The conceptualization of organization structure along the mechanistic-to-organic dimension (or, more concisely, the organicity dimension) is based on the research of Burns and Stalker (1961). Briefly, mechanistic structures are those in which greater importance is attached to line authority than to expertise; specialized jobs have relatively limited access to information about the business overall; extensive vertical communication and limited lateral communication occur within the hierarchy; operating procedures and processes are often codified or otherwise formalized; and adherence to formal job descriptions is the

norm. By contrast, organic structures are those in which greater importance is attached to expertise; information and knowledge are widely and openly shared among the organization's members; loose, informal control mechanisms and the norm of cooperation are used to direct individuals' actions; the pursuit of goals is often carried out with little concern for past practice or existing procedures; and informal patterns of interaction are used as the basis for adjusting and continually redefining processes and individual responsibilities.

Many researchers have proposed or empirically demonstrated that the most effective organizations tend to use organic structure in turbulent, dynamic environments and mechanistic structures in more stable, predictable circumstances (e.g., Lawrence & Lorsch, 1967; Woodward, 1965), as organic processes focus on flexibility, spontaneity, and individuality, whereas mechanistic processes focus on control, stability, and order. In other words, the increasingly uncertain environment resulting from technological advances and the resulting new market demands will eventually lead to an increasing organic structure adjustment that is flexible to take advantage of the emerging opportunities and deal with the potential challenges.

Organizational strategy is viewed as a consistent pattern in a stream of decisions (Inkpen & Choudhury, 1995). The theory of organizational strategy can be addressed from different perspectives. It begins with historical analyses (Chandler, 1962), and more recently involves a renewed focus on resource-based and firm capabilities approaches. Despite the distinct focus, predominant perspectives regard organizational strategy as deliberately intended, and elaborately planned. A growing body of theoretical work

concerning organizational strategy addresses improvisation as an important organizational process.

The conceptualization of organizational strategy along the planning-to-improvisation dimension (or, more concisely, the improvisation dimension) recognizes that organizational strategy is variously grounded in experience and intuition versus formal analysis and explicit methods, as well as in the spontaneous and creative facets of strategy as an innovative solution to intractable problems and a pathway to ingeniously adapt to a set of circumstances (Preston, 1991). A planning based strategy formulation style exists at the low end of the strategy improvisation dimension. Strategy formulation in this style is heavily reliant on quantitative decision-making tools and characterized by research, systematic evaluation of alternatives, and formal reports. This style is also commonly referred to as the “rational” decision-making style. An improvisation based strategy formulation style exists at the high end of the strategy improvisation dimension. Strategy formulation in this style is heavily influenced by hunches and instincts that are often based on the organization’s past experience, established routines, and organizational capability and expertise in certain fields.

Mintzberg and Waters (1982) captured the strategy that is not intended by the organization as emergent strategy; Inkpen and Choudhury (1995) argued that the deliberate strategy absence and the trial-and-error approach may free organizations from rigidity and insularity resulting from the formalized system, and promote flexibility in organizations. It has been argued that in some cases, fast-changing environments can destroy the value of existing competencies (Tushman & Anderson, 1986), and that organizations may find it necessary to improvise or compose new behaviors. Therefore,

the level of strategy improvisation is positively related to the level of environmental turbulence. Emergent strategy becomes germane when strategic flexibility is required for organizations to be adept at engaging in opportunistic searches for under-served or unlocated market segments and niches.

Our investigation on the adaptation at the managerial level focuses on the fit between structure organicity and strategy improvisation. On the general matter of why organization structure should be aligned with strategy formulation processes, Miller (1992) observed that structures and strategy both serve similar ends; for example, to effect control, achieve predictability and efficiency, and extend collective cognitive capacities. They each reduce uncertainty, parceling out administrative complexity while integrating and systematizing organizational effort.

In addition, structure and strategy are mutually supported. Smooth implementation of organizational strategy demands a corresponding match of organizational structure; and organizational structure needs to vary to meet the strategic needs. It is argued that organizations' adaptive capability for rapid and informed action is a function of the goodness-of-fit that exists between organizational structure and organizational strategy. That is, certain organizational structure and strategy combinations will likely facilitate an organization's ability to quickly sense, process, and act on information relevant to new or currently pursued business opportunities and emerging or potential external threats, thus enabling organizations to be strategically responsive. A state of internal coherence is achieved when a high level of strategy improvisation is supported by organic structural contexts that relate to widely and openly shared information and knowledge among organizations' members, emphasis on the individual expertise, and a loose, informal

control mechanism as well as the high autonomy of individuals; or when a low level of strategy improvisation or planned strategy is supported by mechanistic structural contexts that are associated with specialized job responsibilities, and codified or formalized operating procedures or processes.

Although organizations' adaptive response to the technical environment shift leads to a corresponding structure readjustment and strategy reorientation, the achievement of fit between structure organicity and strategy improvisation is not made all of sudden. Normally, the adaptive adjustments follow hierarchical time orderings or paths based on the relative costliness of the resulting organizational changes (Carter, 1990; Cook et al., 1983). Organizations may improvise strategic behaviors to deal with the unexpected jolts or surprises resulting from the environmental changes that make prior plans irrelevant or incomplete in important ways; however, it is not similarly easy to accommodate an instant structure alteration and disrupt the core operation structure in a short time. Therefore, it is expected that changes in the conditions of the technical environment will first widen the misbalance between the structure organicity and the strategy improvisation level. While the consequent structure adjustment gradually matches the strategy reorientation, structure-strategy congruence may finally be achieved. Particularly, we propose the following:

H2: The technical environment turbulence will have a curvilinear (concave) relationship with the fit between the structure organicity and the strategy improvisation in hospitals with a conservative mode of adaptation: Specifically, the increasing turbulence in the technical environment will first decrease and

decrease and then increase the fit between the structure organicity and the strategy improvisation level.

Induced adaptation by the institutional environment

Organizations are embedded in a legal environment made of rules. Because these rules influence and constrain their behaviors, organizations have incentives to act as institutional entrepreneurs by attempting to modify them or to participate in their construction to their advantage. This entails a process of management of legitimacy. Legitimacy can be defined as “a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman, 1995, p.574). Generally, the legitimacy concept can be conceived in two different ways (Oliver, 1991; Suchman, 1995). On the one hand, legitimacy is an external variable attributed by the environment. In this case, legitimacy implies the need for organizations to conform to social norms and can be considered as transcendental. This concept prevails especially in a lot of institutional works (e.g., Powell & DiMaggio, 1991), and particularly applies to the interactive relationship between the institutional environment and organizations with a conservative mode of adaptation. On the other hand, legitimacy can be conceived in a more pragmatic view (Suchman, 1995). Organizations can manage legitimacy by acting strategically to manipulate other actors’ perceptions. This perspective is prevalent in the resource dependency theory or the impression management theory and underlines the instrumental value of legitimacy. Particularly it can be reflected in the interactive relationship between the institutional environment and organizations with an entrepreneurial mode of adaptation.

Institutional perspectives generally emphasize the role of social factors in driving organizational action, including external conformity pressures from regulatory bodies or parent organizations (e.g., D'Aunno, Sutton, & Price, 1991), social pressures from other organizations with ties to the focal organizations (e.g., Westphal, Gulati, & Shortell, 1997), as well as collective, social construction processes (e.g., Burns & Wholey, 1993). In institutional environments these pressures contribute to isomorphism, or the emergence of common organizational practice over time (DiMaggio & Powell, 1983). DiMaggio and Powell (1983) identified three types of isomorphism: coercive, mimetic, and normative. Coercive isomorphism stems from political influence of regulatory agencies and the organizational intention for legitimacy (Child & Tsai, 2005). Mimetic isomorphism occurs when organizations, especially those facing high uncertainty, tend to model themselves after similar organizations in the field that they perceive to be more legitimate or successful (Deepphouse, 1989; Lee & Pennings, 2002). Normative isomorphism is associated with professionalization. Formal education and professional networks are two important sources for normative isomorphism (Roberts & Greenwood, 1997).

The health care industry in the U.S. has long been characterized by institutional pressures that are both strong and heterogeneous (Stevens, 1989). All branches of the local and state government, regulatory agencies, and professional networks make decisions that affect the health care field. The result of the conformity due to the isomorphic pressure from institutional environment is the formation of organizational legitimacy.

More so than most organizations, hospitals have traditionally attempted to differentiate structurally, so as to separate and insulate the sphere of technical tasks, under the jurisdiction of the medical staff, from administrative tasks, under the control of managers (Smith, 1955; Goss, 1961). Consequently, Ruef and Scott (1998) distinguished between two levels of legitimation efforts within health care organizations. One is managerial legitimacy that involves normative support for organizational mechanisms such as personnel management, accounting practices, and rules of conduct and structure of the administrative staff. With respect to hospitals, in particular, such legitimacy is typically conferred through oversight bodies (e.g., the American Hospital Association) that review the structure and functions of governance boards and administrator hierarchies. The other level is technical legitimacy that focuses on core technology, including normative support for staff qualifications, training programs, work procedures, and quality assurance mechanisms. In the health care sector, these assessments specifically revolve around patient-focus tasks, such as diagnosis, treatment, education, and continuum of care, as well as ethical standards concerning patient rights (Ruef & Scott, 1998). According to Ruef and Scott, because technical legitimacy is typically governed by different social values (quality of patient care and specialty training among health organizations) than managerial legitimacy (efficiency and cost-containment), the types of procedures suggested by different normative sources need not be complementary and may even conflict with one another.

Hospital organizations improve their survival chances insofar as they are successful in conforming to and thus obtaining legitimacy from normative sources. The particular

particular salience of managerial and technical dimensions of legitimacy may vary depending on the nature of an organization's environment.

As clinical IT application in healthcare has been believed to be related to numerous organizational benefits, and can serve as one of the prime tools to address the continuous concern over patient safety and quality of care, we propose that, for hospitals with a conservative mode of adaptation, the implementation of clinical IT sophistication is a result of conformity to the technical legitimacy requirement from the institutional environment, and is consistent with the norms of medical profession that result from the medical education and licensing standards, and from the publicly available indicators of technical standards. As a result, we expect that a hospital with higher technical legitimacy also excels in terms of appropriate set-up and sufficient utilization of computerized medical equipment and specialized technology, and in the integration of various systems and technologies. Therefore,

H3: A hospital's technical legitimacy is positively related to the clinical IT sophistication in the hospital with a conservative mode of adaptation.

Similarly, we propose that, for hospitals with a conservative mode of adaptation, the organizational activities at the managerial level in terms of structure adjustment and strategy reorientation are also a result of the institutional pressure from the external environments and the conformity to the managerial legitimacy requirements from the institutional environment.

Since 1980s, healthcare providers have increasingly adopted corporate symbols and practices (Starr, 1982; Hafferty & Light, 1995). The era of market forces and managerial ascendance was underway that encouraged the development of diverse organizational

organizational forms. On the one hand, some freestanding medical institutions still survive in their local environments with professional dominance; on the other hand, more healthcare organizations are involved in healthcare delivery systems embedding in an extensive system of networks. These networks increasingly pervade the sector in the form of multi-hospital systems (Shortell, 1988), purchasing cooperatives (D'Aunno & Zuckerman, 1987), contract management arrangements (Morrisey & Alexander, 1987), and other strategic alliances. While many of these ties resemble the lateral connections among providers, integrative connections among providers, consumers, and funding sources also play a critical role (Zuckerman, Kaluzny, & Ricketts, 1995). Under these conditions, managerial functions – both to encourage the development of more efficient managed care delivery systems and to create and monitor contracts and alliances – become more critical to the survival of healthcare organizations. We expect a hospital's management will work to adjust the organizational strategy to fit into the salient structure requested from the institutional environment, conforming to the managerial legitimacy requirements accordingly. Similarly, we propose:

H4: A hospital's managerial legitimacy is positively related to the fit between the structure organicity and the strategy improvisation level in the hospital with a conservative mode of adaptation.

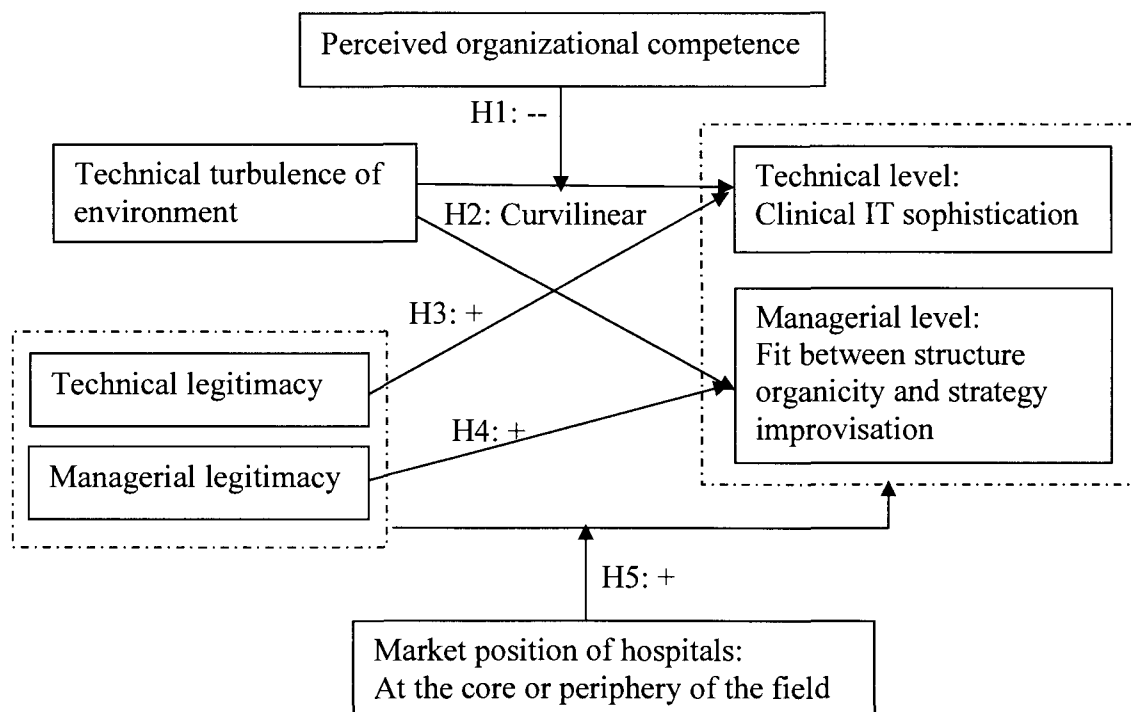
We also propose that the market position of a hospital organization will influence its embeddedness in its institutional context. It has previously been widely noted that legitimated structures and practices are diffused and perpetuated mainly by prominent organizations that stand at the top of the status hierarchy and compose the core of an institutional field (DiMaggio & Powell, 1983; Fligstein, 1991; Haveman, 1993); and that

institutional changes in general tend to begin on the periphery of an institutional field (Hirsch, 1986; Kraatz & Zajac, 1996; Leblebici et al., 1991). Thus we expect that peripheral hospitals are less embedded in the institutional environment since they often have shorter histories in the field, lesser roles in constructing existing institutions, less understanding of and commitment to prevailing institutions, and less to gain from their perpetuation. The hospitals at the core of the field exhibit the opposite. Their core positions also illustrate their success in the field, and motivate their continuous persistence in the established practice and routines. Thus, we propose:

H5: For hospitals with a conservative mode of adaptation, the hospitals at the core of the field have stronger institutional legitimacy (the summation of technical legitimacy and managerial legitimacy) than the hospitals at the periphery of the field.

Hypotheses of conservative mode of adaptation are summarized in Figure 2-1.

Figure 2-1: Hypotheses of Conservative Mode of Adaptation



In summary, hypotheses 1-5 reflect the reactive business logic or logic indicating the acceptance of the external environment as given. Such reactive practice dictates that success starts with careful environment research, investigating the customers' needs, and developing differentiated products or services for a well-defined segment. Such market-driven reactive business logic favors incremental adjustments to changes in the business environment and works through accumulative organizational learning (Jaworski, Kohli, & Sahay, 2000).

Our propositions can find related cases from descriptions of market-driven organizations in the marketing literature. In order to maintain competitive advantage, such organizations adapt their structures, strategies, and technical capabilities to reflect changes in the industry environment and continue to effectively serve the needs of their target markets. This conservative adaptability has resulted in an increased focus on being external environment and market oriented. This process by which customer, competitor, and regulatory information is collected, analyzed, and disseminated throughout the organization has become key to the management practices of many organizations in order for them to catch up with the changes in the technical and institutional environments, particularly in the areas of product development and marketing strategy. Various excellent companies such as Procter & Gamble and Unilever effectively employ this market-driven approach (Kumar, Scheer, & Kotler, 2000).

Entrepreneurial Mode of Adaptation as Strategic Proactiveness

Our approach emphasizes a distinction between entrepreneurship as an on-going process versus one-time-only efforts to implement change. Organizations with an entrepreneurial mode of adaptation fall into the former type, and entail a persistent,

organizationally sanctioned pattern of change-related activities and resource allocations. Organizations with an entrepreneurial mode of adaptation are characterized as risk-taking, innovative, and proactive in their business operations; continuous change and moving forward are expected to be a dominant feature of organizational evolution. In contrast with the passive nature of the organizations with a conservative mode of adaptation, and rather than merely reacting to market conditions by choosing the most appropriate technology, structure and strategy for those conditions, organizations with entrepreneurial mode of adaptation behave more like an activist firm. They try to modify the demand for their products/services and engage in the development of new technologies (Nelson, & Winter, 1982).

Entrepreneurial mode of adaptation can be illustrated from the environment enactment perspective. Rather than merely responding to their environment, organizations with an entrepreneurial mode of adaptation are actually manipulating and creating their environment. Correspondingly, entrepreneurial adaptation is about how organizations enact their environment, and how organizations legitimize their practice. On a broader level, the notion of enactment illustrates how a social constructionist approach to social reality can be pushed beyond the micro level of face-to-face interactions to the intermediate level of organizations. Constructions of meaning established through enactments are crucial to understanding organizational perceptions of environmental turbulence and processes of legitimization. As such, enactment provides a theoretical link between environments, symbolic actions within the organization, and the substantive outcomes of the organization.

On the one hand, organizations with an entrepreneurial mode of adaptation tend to change or innovate boldly and regularly while taking considerable risks in their business operations. Organizational goals and self-defined strategies rather than environmental factors are their prime internal motivation for the proactive and exploratory movements. Such organizations emphasize flexibility, and actively search for or even create opportunities or market niches. Their proactive and exploratory movements can induce environmental dynamism, hostility, and heterogeneity, and may be partly responsible for the environmental uncertainty by contributing a challenging product innovation or a new business practice. New practice or innovation contributes to new products and services that can be exploited in different markets, thus prompting imitation and changes in the routine, and inducing inter-organizational competitions in the field.

On the other hand, organizations with an entrepreneurial mode of adaptation need to enhance their survival and growth by increasing the legitimacy of the organizing effort, and appear as a legitimate, reliable, and accountable actor. Reliability and accountability are two important features required of legitimate organizations. Reliability refers to the organization's ability to provide superior returns consistently, compared with the returns that shareholders can realize by pursuing alternative investment opportunities. Accountability refers to the ability of an organization to explain to its shareholders that resources have been used appropriately and that managerial actions taken are in the best interests of shareholders. The legitimization can also be accounted for by the enactment process in which the institutional myths are created or constructed, and institutional demands are enacted. Current research on legitimacy creation being reliable and accountable has emphasized the socially constructed nature of markets and the role of

perception in market exchanges (Aldrich & Fiol, 1994; Rindova & Fombrun, 1999). Firms either actively pursue legitimacy by conducting symbolic and impression management strategies (e.g. Elsbach, 1994; Ritti & Silver, 1986), or their organizational level accumulation of legitimacy is impacted and promoted by third parties like media legitimation effects (e.g. Pollock, & Rindova, 2003). Over time, the legitimization process necessitates the development of new routines and results in the institutionalization of new practice.

We illustrate the process of an entrepreneurial mode of adaptation in the following sections.

Autonomous adaptation at the technical level

Entrepreneurial organizations' autonomous adaptive behaviors at the technical level emphasize the enactment impacts of organizations' proactive technical activities on the external technical environment. Enactment is the process whereby the environment is actively constructed, existing within the constructions of organizational members rather than outside the organization in the form of an external constraint (Weick, 1977). The enacted environment means that organizations do not merely adapt to their environment, and that views of the environment in terms of external constraints or resources are limiting (Smircich & Stubbart, 1985). In enacting their environments, organizations assume a more active role in defining environmental demands and incorporating them into their own definition of reality. The result of the enactment is that organizations are actually extending their technical activities to the environment, and creating the chaos and orderliness accordingly. Thus the enacted environment is not just the environment which is perceived. Enactment is action; it is the process whereby participants manipulate

and create the environment (Weick, 1979) and build up their activities which reshape the environment accordingly. For example, Peters (1987) has pointed out that the successful marketing planner must not simply tolerate chaos; he or she must relish creating further chaos for his or her competitors. Similarly, Schumpeter (1934) coined the phrase “creative destruction” to describe the effect of entrepreneurs on the environment. Also, enactments point to multiple constructions, to multiple realities which allow for the possibility of conflict between enactments (Smircich & Stubbart, 1985). Thus environment can become more turbulent as a result of multiple enactments by different organizations. Along with the logic, we expect that a hospital’s IT application is closely related to the corresponding technical environment characteristics like dynamism, hostility, and heterogeneity. Thus we propose:

H6: The clinical IT sophistication in the hospital with an entrepreneurial mode of adaptation is positively related to the technical environmental turbulence.

Organizations with an entrepreneurial mode of adaptation need to legitimize their sophisticated technical activities. Legitimation is also a process to shape the favorable perception of internal and external stakeholders of the organization. In order to justify and legitimize their aggressive and proactive technical activities, entrepreneurial organizations expect to resolve the internal pressures and to meet the external demands with their new practice.

Organizational movements thrive if environmental conditions are conducive to their advance (McAdam, 1982). For hospital organizations, one of major external stakeholders is the related regulatory agency. Regulatory agencies can affect hospital practice in two ways. First, regulatory agencies influence resource flows in markets and member

member hospitals; they control incentives for conformity, which may include funds, personnel, or other material resources (D'Aunno, Sutton, & Price, 1991). Second, regulations may exert an indirect effect on member hospitals by creating “cultural expectations or norms” in the society within which the organizations function (DiMaggio & Powell, 1983). These cultural expectations can have a powerful impact because they embody widely shared beliefs about how hospitals should behave (Scott, 1994).

Regulatory agencies establish these expectations by regularly examining medical records, looking for documented evidence of certain hospital practices, observing whether hospitals use structures, policies, and procedures for required practice, and granting to the isomorphic hospitals acceptance, social-psychological support, as well as legitimacy resources.

In order for hospitals to be successful, organizational behaviors – whether driven by cost, technology, distribution, service, or other competitive advantages of the firm – have to be consistent with regulatory agencies’ needs, perceptions, and preferences. It is difficult for a hospital organization to survive if its technical activities are not accepted by its regulatory agencies, as these agencies are the legitimation sources of the hospital. Therefore, in order to justify and validate their proactive moves in technical activities, gaining supports from the contextual conditions, hospitals with an entrepreneurial mode of adaptation need to gain the affirmation of distinctive worthiness by outside influential parties. We propose that the implementation of clinical IT sophistication motivates hospitals to build up ties to regulatory agencies and to actively seek for accreditation or membership from accrediting and certifying entities that normalize and provide official assessment of the standard of medical care and quality improvement.

On the one hand, these hospitals may conduct market-driving behaviors that stimulate or create customers' demands for the clinical IT sophistication, and convince customers that the technology adoption can address consumers' demands for the improvement of quality of medical care and the elimination of medical error at a reasonable cost, or at least prove the relevance to such expectations. By doing this, hospitals with an entrepreneurial mode of adaptation help create a consumer pool for gaining affirmation of the distinctive worthiness of their proactive technical moves. On the other hand, entrepreneurial organizations may go beyond that by proving the available customer values and by imposing new ideas of products and services to lead regulatory agencies to envision breakthrough products and services that eventually come to value (Hamel & Prahalad, 1994). This position has been justified by the observation that fifteen years ago, most external stakeholders were not clamoring for books and CDs over the internet, 24-hour discount brokerage accounts, cars with on-board navigation systems, or the Home Shopping Network; yet they had a recurring problem to be solved, or a deep-seated need to be satisfied, by these offerings – otherwise the innovations would not have succeeded (Day, 1998).

As more affirmation of distinct worthiness by different regulatory agencies would increase the legitimacy of hospitals' proactive moves, entrepreneurial hospitals would maintain a constant formal and informal dialogue with different regulatory agencies by educating them about the idea of the new practice, and by conducting market experiments and carefully evaluating the results of those experiments. Communication channels can also be built up through other ways, such as purchase consultants, universities, alliance partners, or suppliers, which have an insight into latent customer needs and technologies

for satisfying those needs. The result of new ideas education, market-driving, and market experimentation behaviors could be the emerging new standards for technology evaluation, and acceptance of entrepreneurial clinical IT sophistication, along with the short life spans of products/services caused by rapid and discontinuous technological change (Achrol, 1991). Therefore, we believe entrepreneurial hospitals' implementation of clinical IT sophistication also motivate them to actively establish numerous ties with regulatory agencies to gain justification and legitimacy.

H7: The clinical IT sophistication in the hospital with an entrepreneurial mode of adaptation is positively related to the number of regulatory agency ties the hospital has.

The hospital organizations can also legitimize their technical activities by demonstrating that their aggressive activities can help resolve organizations' internal pressure.

The possibility for an organization to implement ambitious activities is based on the availability of disposable resources. Resource slack refers to a situation in which resources in addition to the original budgeted allocation are made available to support the activity (Nohria, & Gulati, 1996; Sharma, 2000). Slack resources include physical entities such as cash, people, nonobsolete inventory, machine capacity, and so forth. In organization theory, slack has been suggested to perform as a facilitator of strategic behavior, which allows the firm to experiment with proactive strategies such as introducing new products and entering new markets (Thompson, 1967). Organizational slack has been broadly conceptualized along two dimensions (Sharfman, et al., 1988). One is absorbed slack, which amounts to excess costs in organizations, and is not easy to

redeploy; another is unabsorbed slack, which corresponds to currently uncommitted resources, and is more easily redeployed elsewhere. We expect that absorbed and unabsorbed slack may have different implications for firm performance, in that different types of slack resources give managers greater or lesser degrees of discretion and flexibility in their approach to reducing internal or external pressures, although “a priori theory about the differential effects of the two slack components is lacking” (Singh, 1986:567). As unabsorbed slack can be used in a wide variety of situations or can give managers a number of options, this type of slack can also be a resource waste or lead to sloppy inventory without appropriate employment, and breeds inefficiency and hurts performance. Therefore, we expect that organizations validate their aggressive and proactive technical activities by demonstrating that proactive technical activities are effective resolution and appropriate utilization of organizational unabsorbed slack. That is, the implementation of clinical IT sophistication is positively related to the transfer of slack resources from being unabsorbed to being absorbed. Thus,

H8: The clinical IT sophistication in the hospital with an entrepreneurial mode of adaptation is negatively related to the hospital's unabsorbed slack resources.

Based on the above propositions, we argue that the process that organizations legitimize their advanced technical activities and their legitimation efforts will result in an increase in their technical legitimacy.

H9: The clinical IT sophistication in the hospital with an entrepreneurial mode of adaptation is positively related to the hospital's technical legitimacy.

Autonomous adaptation at the managerial level

Across the industry, health care organizations have identified information technology as a strategic imperative essential to reducing medical errors, improving efficiency, and capturing market share (Arlotto, 2006). Therefore, hospitals with an entrepreneurial mode of adaptation need to adjust their strategy and structure at the managerial level accordingly to fit into the management of IT as a strategic asset, and to promote the implementation of aggressive activities at the technical level.

In order to facilitate the entrepreneurial posture at the technical level, the organization's overall strategic philosophy or orientation should permit flexibility and rapid decision making contingent on the changing conditions. Thus, rather than insisting on a clearly stated long-term plan, organizations with an entrepreneurial mode of adaptation may prefer broadly and ambiguously defined purposes, and would like to improvise on the specific tactical manifestations of the strategy that facilitate the achievement of growth goals. An organization's entrepreneurial posture can struggle or flourish in association with particular organizational structure. The attributes of an appropriate structural match will often include decentralization of decision-making authority, minimal hierarchical levels or structural layers, free-flowing communications channels, and closely integrated R&D, production, and marketing functions (Covin & Slevin, 1991). Evidence has suggested that organicity may be only one structural attribute to contribute to the efficacy of entrepreneurial firm-level behaviors (Bahrami & Evans, 1988).

On the other hand, facilitating organizational change at the managerial level also requires the justification of the structure adjustment and strategy reorientation in an expectation that the resulting organizational configurations at the managerial level can

also address the internal pressures accordingly and convince employees, the important internal stakeholders, of the legitimacy of their internal configurations of strategy and structure. Particularly, these changes at the managerial level should contribute to the effective utilization of organizations' intellectual capital, and the continuing growth of employees.

Employees are the major implementers and adopters of these refined strategies, and the structure adjustments will influence the connections and working relationship among employees. Particularly, organizations can justify their organizational configurations in strategy and structure as they are conducive to the full utilization of organization's intellectual capital that is embedded in the employees and their interactive relationships. Organization's intellectual capital is considered as the sum of all knowledge organizations utilize for competitive advantage (Youndt, Subramaniam, & Snell, 2004; Nahapiet & Ghoshal, 1998). Previous research has identified human capital as one prominent aspect of intellectual capital. Human capital is defined as the knowledge, skills, and abilities residing with and utilized by individuals (Schultz, 1961). The collective of the employees' knowledge and capabilities can eventually add up to form the institutionalized knowledge and codified experience residing with and utilized through databases, patents, manuals, structures, systems, and processes (Youndt et al., 2004), and presents as the knowledge embedded within, available through, and utilized by interactions among individuals and their network of interrelationships (Nahapiet & Ghoshal, 1998).

Specifically, the flexible strategy orientation (as manifested by the degree of strategy improvisation) and the organic structure facilitate employees' participation as a

result of decentralization of hierarchical power, and contribute to the greater degree of exploitation of organization's intellectual capital. Improvised strategy depends on the implementation and integration ability of employees; organic structure facilitates the full play of individual expertise, and fast decisions and quick moves. One extreme example of this organizational form with organic structure and improvised strategy can be the clan organization proposed by Quchi (1980). Clan organizations are typically closely integrated and technologically advanced. For such organizations, technologies change frequently; teamwork is common, and power is decentralized at the team level; people work together beyond hierarchical ladder; individual performance is highly ambiguous; and no formal plans and performance criteria are formulated. Such type of organization is suited for coping with an uncertain market (Dickson, 1992).

The exploitation of an organization's human capital is also a process of deepening and augmenting their knowledge by harnessing the preserved knowledge capital through structured recurrent activities. On the one hand, such a process creates a path-dependent trajectory of reinforced knowledge (Daneels, 2002). On the other hand, the organic structure and flexible strategy combination allows an organization's access and exposure to a variety of new and alternate knowledge domains, and encourages the origination of a new way of thinking (Subramaniam & Youndt, 2005). For example, organic structure blurs the hierarchical boundary, extends the communication channel, and makes possible direct and immediate interaction within organizations; this flexible and active interaction could contribute to the organizational learning environment, and improve human capital as a result. Therefore, the fit between structure organicity and strategy improvisation not only strengthens and reinforces the preserved knowledge and the prevailing intellectual

capital, but also facilitates the interactions and exchanges of ideas, steers the evolution of the knowledge body, and enhances the richness of the organization's human capital. The organization's human capital is augmented as a result.

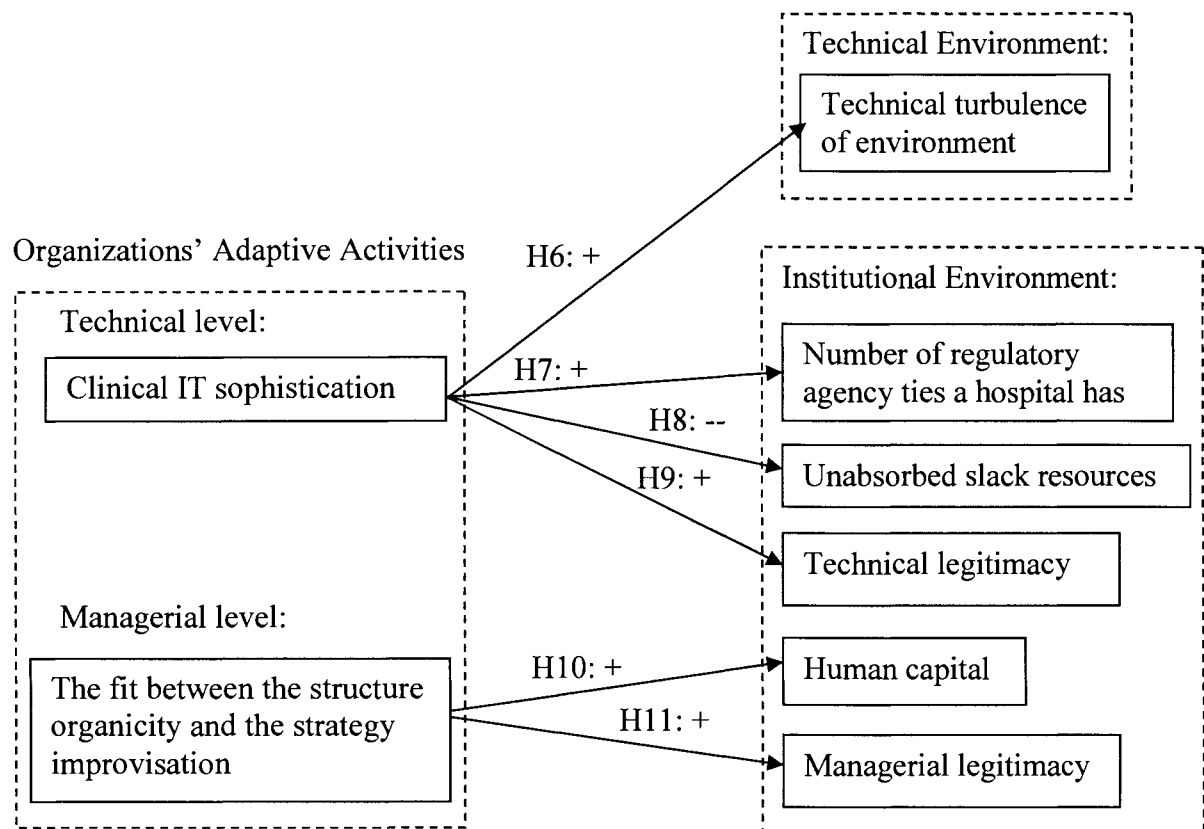
H10: The fit between the structure organicity and the strategy improvisation in the hospital with an entrepreneurial mode of adaptation is positively related to hospital's human capital.

Based on the above propositions, we argue that the process that organizations legitimize their strategy improvisation and structure organicity and the corresponding resolution of organizational pressure will result in an increase in their managerial legitimacy.

H11: The fit between the structure organicity and the strategy improvisation in the hospital with an entrepreneurial mode of adaptation is positively related to the hospital's managerial legitimacy.

Hypotheses of entrepreneurial mode of adaptation are summarized in Figure 2-2.

Figure 2-2: Hypotheses of Entrepreneurial Mode of Adaptation



To summarize, the arguments about organizations with an entrepreneurial mode of adaptation can find counterparts or parallel examples from marketing literatures regarding market-driving organizations. Market-driving organizations are proposed for avoiding an over-reliance on market orientation (market orientation has been primarily “reactive”, and focused on meeting the expressed needs and value propositions of current customers). Instead of simply being driven by the market’s other key participants, channel partners, or customers, market driving organizations gain a sustainable competitive advantage by delivering a leap in customer value through a unique business system, redirecting an industry or product/service market in a new, often previously unexpressed direction, and positioning the market driving organization as “ideal” or “acceptable” in the eyes of internal (e.g., employees) and external (e.g., customers,

regulatory agencies) stakeholders through impression management or strategy implementation at the product/service, market, or industry levels.

Particularly, market-driving organizations are characteristic of being pioneering and customer-leading (Hills & Sarin, 2003). Pioneering is described as being the first or the early behaviors to introduce a new product/service or pioneering practice to market, and to address some deep-seated, latent and emerging needs of the customers. Customer-leading is described as a process of uncovering the latent needs of customers, and directing their preferences and behaviors in new directions. As a result, the existing market category can be redefined in such a fundamental way that competitors are rendered obsolete, and new markets can be created. Ultimately, these organizations can revolutionize their industries by changing the rules of the game and driving their markets.

The phenomenon of market-driving organizations and their proactive activities provides illustrative cases and contextual support for our hypotheses 6 to 11. Consistent with our propositions for organizations with an entrepreneurial mode of adaptation, market-driving organizations act as change agents or catalysts; their activities may involve breakthrough technology, new practice, or breakthrough marketing strategy. The new technology or new practice can substantially alter the landscape of the industry, and create environmental turbulence by redefining the technology and customer composition of the environment, as proposed by hypothesis 6. Such change could be directed beyond just customers and competitors, to other relevant internal and external stakeholders (Morgan & Hunt, 1994) such as organizational employees, channel members, allies/partners, and regulatory agencies. For example, market-driving organizations don't just engage in educating customers about product/service attributes or new practice

benefits (Kumar, Scheer, & Kotler, 2000), but their activities extend to creating fundamental shifts in the attitudes, behaviors, and structures of competitors, potential partners, investors, employees, regulators, and other industry-level actors (Hill, 1997; Shapiro & Varian, 1999; Jaworski, Kohli, & Sahay, 2000). They are doing so to shape the perception of institutional actors and improve the legitimacy of their proactive practice, as presented in our propositions regarding the organizational impact on the institutional environment: hypotheses 7, 8, 9, 10, and 11.

It has been argued (Hills & Sarin, 2002) that adopting this behavioral standard of being proactive and market-driving is critical in technologically oriented industries, particularly for nascent product/service development ventures and entrepreneurial start-ups. Some other cases of such pioneering organizations are for instance, Amazon.com, Body Shop, CNN, IKEA, Starbucks, Swatch, and Tetra Pak, whose success has been based on their market-driving behavioral standards and consequently radical business innovations (Kumar, Scheer, & Kotler, 2000). In these situations, the existence of network effects implies that organizations that can develop the product or process standard for the industry can reap disproportionate rewards in the long run. Those that fail to drive the market towards their own organizational capabilities are often relegated to less desirable niche positions, or eliminated from the market entirely.

Performance Implication

Conservative and entrepreneurial organizations naturally differ in their objectives, dominant strategic orientations, and functional strengths. Organizations with a conservative mode of adaptation emphasize the efficiency side of effectiveness, avoid risks, and perform little innovation (Karagozoglu & Brown, 1988). They derive their

strengths from efficient production and compete on the basis of the lowest possible price, while maintaining high standards of quality. In contrast, organizations with an entrepreneurial mode of adaptation emphasize flexibility side of effectiveness, and entails high degrees of innovation and risk taking. Such organizations tend to behave aggressively, and engage in substantial new product/service and market development. The innovation related activities may be concerned with the creation of new businesses within the existing business or with the renewal of ongoing businesses that have become stagnant or in need of transformation. Consequently, conservative managements develop organizational strength in financial management, production, and applied engineering; entrepreneurial organizations develop strength in product/service research and development, basic engineering, and market research (Snow & Hrebiniak, 1987). Those features have different implications for the assessment of organizational performance. Specifically, we expect that organizations with a conservative mode of adaptation tend to excel in the assessment of the efficiency side of performance, which particularly relates to organizations' financial measurement based on the ratio of output over input, such as profitability; and organizations with an entrepreneurial mode of adaptation tend to excel in the assessment of the flexibility side of performance, which particularly relates to organizations' innovation capability.

H12: The performance assessment of organizational efficiency (indicated as financial performance) is higher for hospitals with a conservative mode of adaptation than hospitals with an entrepreneurial mode of adaptation.

H13: The performance assessment of organizational flexibility (indicated as

innovation capability) is higher for hospitals with an entrepreneurial mode of adaptation than hospitals with a conservative mode of adaptation.

CHAPTER III

METHODOLOGY

Sample and Procedures

One way to move forward a general understanding of the adaptation mode of hospital organizations is through intensive analysis in one particular sector of the health care arena. Concentration of the research focus can help to identify and isolate factors that clarify the nature of the phenomenon in that sector, and at the very least, can be helpful in suggesting hypotheses that may be generalizable beyond that sector and tested in others (Kimberly & Evanisko, 1981). The research reported in this paper concentrates on the adaptation practice by the general medical and surgical hospitals in the U.S., and attempts to test the interactive relationships between different environmental sectors and hospitals' adaptive behaviors at the different levels of organizations.

This study uses a cross-sectional design to investigate the relationships between our focus constructs. We assume that in the long term, the impacts between environmental sectors and organizations can be mutual and circular. That is, while environment may shape organizational activities, organizational activities can also change environmental settings. However, for a given period of time, we assume that the relationship with the direction from environmental sectors to organization will be much stronger and significant for organizations with a conservative mode of adaptation, and the relationship with the direction from organizational activities to environment will

be much stronger and significant for organizations with an entrepreneurial mode of adaptation.

Data were collected from two sources. First, field surveys were conducted to derive primary data covering all the focus constructs in our research framework. Particularly, our survey focused on the Texas area. This specific area focus is on the one hand, the result of the finance limit; yet it also allows the validity of comparison by eliminating or minimizing the influence from other deviating factors like different macro economic environments and prejudiced state government policies. In addition, Texas is the second largest U.S. state in both area and population, with more than 500 hospitals (retrieved from Wikipedia, the free encyclopedia, 2008), as estimated in 2006. The wide open locations of Texas hospitals, the rapidly growing population as the potential patient customer pool, and the sufficient number of hospitals with different organizational sizes assures a broad spread of characteristics distribution of the health care environments, and enables us to address different levels of organizational complexity in coping with the same level of industrial uncertainty. A mailing list for major general medical and surgical hospitals in the Texas area is sorted out from the American Hospital Association Guide. The mailing addresses and the administrators' names are further justified by matching with the online files from the websites of the Texas Department of State Health Services (Texas Department of State Health Services, retrieved November 6, 2007) and of the Texas Hospital Directory (Texas Hospital Directory, retrieved November 6, 2007).

Since there is no specific sample size required for structural equation modeling, we follow a common recommendation of five times as many observations as variables, with a minimum of 100 observations (Marsh, Hau, Balla, & Grayson, 1998). In addition,

considering a moderate effect size for some hypothesized relationships, the sample size should also be sufficient to estimate the multiple regressions (Cohen, 1988). Thus a randomly stratified sample of 400 hospitals with different organizational sizes was selected across the Texas area. Two rounds of efforts for data collection were conducted. First, surveys were distributed to the hospital administrators or chief medical officers of the selected general medical and surgical hospitals. A cover letter along with two pages of the questionnaire was enclosed. The hospital administrator or chief medical officer was asked to complete the survey or forward it to an appropriate person familiar with certain sections of the survey. About one month later, based on the response rate of the first round of data collection, follow-up phone calls were made to get into direct contact with hospital administrators or the relevant staff to ask for their permission for a second round of data collection as a makeup for the first round of non-responses. A second mailing of 150 surveys with a thank-you gift of Chinese paper-cut included was thus made afterwards.

A total of 112 Texas hospitals responded after two rounds of survey efforts with a response rate of around 19%. The objects cover the major areas of Texas, and present reasonable variations on some organizational characteristics such as staffed bed number, employee number, founding year, and total revenue. Data were further cleaned by list-wise deleting some incomplete responses and cases with extreme values outside of three standard deviations on the focus constructs, to assure the consistency of the sample size for multiple regression analysis and the reliability of the answering styles in the objects. The final sample thus included 99 cases.

We further match our primary data with the archival data to check for or justify the information regarding hospitals' financial performance, their membership and accreditation status, and other control variables such as funding year, hospital type, hospital size as indicated by employee number and bed number, etc. The archival data are mainly drawn from two sources: (1) data on membership and accreditation, and some control variables such as hospital type and hospital size are obtained from the *AHA Guide to the Health Care Field* (2008); and (2) Hospital age and financial performance data are collected from the American Hospital Directory.

Measures

All of the measures used in this study are based on existing scales. Although some constructs have been long well established, we referred to relatively recent publications in the top journals of the management field, and adapted measures accordingly to reflect the recentness of the measures. Particularly we tailored the established measures to reflect the health care background, and revised the wordings accordingly to clearly identify what we are researching. For example, we use health care product or service instead of product or service in general, clinical staff and physicians instead of employees, clinical IT sophistication instead of IT in general, to name only a few. Most constructs are assessed as multi-item measures on a seven-point scale. A pilot study was conducted to pretest the measures using 2 or 3 sample hospitals to establish and validate the clarity of instructions, the amount of time required to complete the instruments, the thoroughness and relevance of the items, and the psychometric properties of the scales.

We describe all measures in the following sections.

Technical Environment Turbulence. Technical environment turbulence captures the change rate and magnitude of technology development in the environment. Hospital administrators' perception of turbulence in the technical environment was addressed by asking the question: To what extent do you agree that the statement "the technology in our industry is changing quite rapidly" describes the external technical environment of your organization? The responses were scored on a 7-point scale demonstrating a variance from very low turbulence to very high turbulence. This item parallels the short version of technical turbulence measures adapted from Atuahene-gima and Li (2004), and Carson, Madhok, and Wu (2006).

Strategy Improvisation. Strategy improvisation was operationalized as the extent to which organizations alter their actions from those indicated in their approved or established strategic plan, and entails both its creative and spontaneous facets. Our focus is both on improvisation from an existing strategy and on an organization's improvisation in general. Furthermore, we focus on both the quantity and the quality of improvisation. The item that reflects the quantity of strategy improvisation is for example: "Our organization improvises a lot in implementing the strategic plan." The sample item that reflects the quality of strategy improvisation is: "We rely principally on experience-based intuition when making operating and strategic decisions." Strategy improvisation was evaluated by a 7-point Likert scale with 3 items adapted from Moorman and Miner (1998), Slotegraaf and Dickson (2004), and Vera and Crossan (2005). The Cronbach alpha coefficient was 0.737. Exploratory Factor Analysis (EFA) with direct oblimin rotation using Kaiser criterion of eigenvalue greater than 1 produced one dominant factor,

and justified the measurement structure. The mean score, averaged across the three items, assesses strategy improvisation.

Structure Organicity. Four items were adapted from Covin and Slevin (1989) to measure the extent to which organizations are structured in organic versus mechanistic manners. The earliest version of the scale was developed by Khandwalla (1976/77). The respondents were asked to indicate on seven-point Likert-type scales the extent to which each item of the measure characterized the structure of their hospitals. Each hospital's mean rating on these items was used as that hospital's organicity index. The higher the index, the more organic the hospital's structure. The Cronbach alpha coefficient was 0.777. EFA with direct oblimin rotation using Kaiser criterion of eigenvalue greater than 1 justified the factor structure. The mean score, averaged across the four items, assesses structure organicity.

Confirmatory Factor Analysis (LISREL 8.30) was further used to verify the dimensionality structure of these two constructs. We refer to several fit statistics to provide an accurate overall picture of model fit (Bollen & Long, 1993). These include the overall chi-square value, the comparative fit index (CFI), the normed fit index (NFI), and the root-mean-square error of approximation (RMSEA). As in this research framework, we look at the fit between the structure organicity and strategy improvisation, and structure organicity and strategy improvisation function as two subscales of the fit scale. The two factors are thus supposed to present certain correlations, and vary in a direction that matches with each other. Therefore, we included both factors in the measurement model analysis to reflect their mutual correlations and assess how the correlation may influence the model fit.

CFA analysis evaluates whether a multi-item measurement model adequately reflects the covariance matrix of the data. All items in the present study were allowed to correlate freely. The specified measurement model was tested with fully standardized coefficients obtained from the maximum likelihood solution. The CFA result indicated that the indicator structure of the constructs strategy improvisation and structure organicity provided an adequate fit ($\chi^2 = 20.36$, $df = 13$, $p = 0.08648$, $RMSEA = 0.076$; $CFI = .97$; $NFI = .92$). In general, factor loadings were moderate to high and all loadings were significant ($t \text{ stat} > 1.96$, $p < .05$). Average variance explained (AVE) represents the percentage of variance accounted for in the construct by the items. A value equal or beyond .50 is acceptable. Table 3-1 presents the details of the CFA analysis.

Table 3-1: CFA for Strategy Improvisation-Structure Organicity Fit Scale

Items and Factor Loadings	Strategy Improvisation (SI)	Structure Organicity (SO)	AVE	CR
SI1	0.79		0.5	0.74
SI2	0.78			
SI3	0.53			
SO1		0.55	0.5	0.78
SO2		0.87		
SO3		0.58		
SO4		0.72		
Fit statistics: $\chi^2 = 20.36$, $df = 13$, $p = 0.08648$, $RMSEA = 0.076$, $CFI = 0.97$, $NFI = 0.92$, NNFI = 0.96, GFI = 0.94				

In our research framework, we focus on the *congruence (fit) between structure organicity and strategy improvisation*, rather than looking at them separately. One way to operationalize fit variable is to follow the traditional method of handling an interaction relationship, and create an interaction term by multiplying two variables together. In this way, the impact of one variable for instant strategy (or structure) is contingent on the status of another variable structure (or strategy). That is, the two variables structure

organicity and strategy improvisation interact with each other and jointly influence organizational activities, and one of the variables structure organicity or strategy improvisation is actually serving as a moderator, although we do not clearly state a moderation relationship. However, this operationalization only works when the fit between structure organicity and strategy improvisation serves as an independent variable. For some hypotheses, for example hypotheses 2 and 4, the fit between structure organicity and strategy improvisation serves as a dependent variable, an interaction term as a dependent variable is beyond what our statistical technique can handle, and not easy for interpretation.

Therefore, instead of using an interaction term to describe the fit variable, we followed the suggestion by Randolph and Dess (1984), a method that was later utilized by Alexander and Randolph (1985), and created a variable indicating the fit between structure organicity and strategy improvisation by using absolute differences between structure organicity and strategy improvisation scores. The measure of fit is consistent with the general fit concept from Joyce, Slocum, and Von Glinow (1982). It is also consistent with the additive definition provided by Schoonhoven (1981) and the ideas of Drazin and Van de Ven (1985). A review by Venkatraman (1989) notes the usefulness of this matching measure of fit when assessing pairs of variables, as in this study, and also notes its intuitive appeal. The measure assumes that for each value of the structure organicity variable there is a best value of a strategy improvisation variable to yield highest performance. Following Randolph, Sapienza, and Watson (1991), fit was defined as 7 minus the absolute difference between the values for a pair of structure organicity and strategy improvisation variables:

$$\text{Fit} = 7 - / \text{Structure organicity} - \text{Strategy improvisation} /$$

With structure organicity and strategy improvisation variables scaled in a fashion of 7-point Likert scale, the smaller the absolute value calculated by subtracting the strategy score from the structure score, the higher the degree of fit. By subtracting this absolute value from 7, the fit score is scaled for easier interpretation, i.e., the larger the obtained fit score, the better the fit. For example, if the structural variable is scored near the mechanistic end of the scale as 1, and the strategy variable is scored near the high improvisation level as 6, the fit variable will have a value of 2, suggesting a poor fit. On the other hand, if structure is near the organic end of the scale as 6, and strategy is on the high improvisation level as 5, the fit variable will have a value of 6, suggesting a good fit.

Human Capital. Measures for human capital were adapted from Subramaniam and Youndt (2005), and describe one prominent aspect of intellectual capital. Human capital has been considered to be the receiver, conveyer, and implementer of organizational knowledge utilized for competitive advantage (Youndt, Subramaniam, & Snell, 2004). Three items, based on the original discussions surrounding human capital (Schultz, 1961) as well as on contemporary strategic human resource management studies (Snell & Dean, 1992), were used to assess human capital and reflected the overall skill, expertise, and knowledge levels of an organization's employees. The quantity and quality of human capital in an organization reflects an organization's ability to appropriate and store knowledge in physical organization-level repositories such as databases, manuals, and patents (Davenport & Prusak, 1998) as well as in structures, processes, cultures, and ways of doing business (Walsh & Ungson, 1991), and an organization's overall ability to share and leverage knowledge among and between networks of employees, customers,

suppliers, and alliance partners. The reliability coefficient of the construct was 0.872. EFA with direct oblimin rotation using Kaiser criterion of eigenvalue greater than 1 justified the factor structure. The mean score, averaged across the three items, assesses human capital.

Organizational Slack. In the early research, measures of slack captured two dimensions of organizational slack: absorbed and unabsorbed, as both were believed to affect firm performance (Sharfman, Wolf, Chase, & Tansik, 1988). Absorbed slack refers to the hard-to-redeploy nature of such slack; unabsorbed slack focuses on the deployable resources contributing to the free cash flow at the discretion of the managers. In this study, we look at the relationship between clinical IT sophistication and organizational slack, and particularly, how the advancement and development of clinical IT may influence the redeployment of the utilizable organizational resource. Therefore, we emphasize the unabsorbed slack dimension of the slack construct. Specifically, we adopted the measures for unabsorbed slack from Tan and Peng (2003), as their measures extended the work of Cheng and Kesner (1997), Davis and Stout (1992), and Singh (1986). Hospital managers were probed, based on a seven-point scale, on (1) whether the hospital's retained earnings have been sufficient for market/capacity expansion; (2) whether it has a pool of financial resources that can be used on a discretionary basis; and (3) whether it is able to secure necessary bank loans or bond. The assessed construct reliability using Cronbach's alpha was 0.753, above the benchmark value 0.7, and was considered adequate for internal consistency. EFA with direct oblimin rotation using Kaiser criterion of eigenvalue greater than 1 justified the factor structure. The mean score, averaged across the three items, assesses unabsorbed organizational slack.

As both human capital and unabsorbed organizational slack fall into the category of deployable organizational resource, with the former emphasizing the soft side of the organizational resource, and the latter focusing on the physical dimension of the organizational resource, we put the two constructs into one CFA analysis model to assess the fit effects of their probable correlations. The CFA result indicated that the factor structure of the constructs human capital and organizational slack provided an adequate fit ($\chi^2 = 8.33$, $df = 8$, $p = 0.40156$, $RMSEA = 0.021$, $CFI = 1.00$, $NFI = .96$). All the items load clearly on discriminant factors with factor loadings in excess of .40, a common threshold for acceptance. As indicated by the AVE index, more than 50% of variance was accounted for in the constructs by the corresponding items. Table 3-2 presents the CFA details.

Table 3-2: CFA for Human Capital and Organizational Slack

Items and Factor Loadings	Human Capital (HC)	Organizational Slack (OS)	AVE	CR
HC1	0.87		0.70	0.87
HC2	0.81			
HC3	0.82			
OS1		0.73	0.51	0.75
OS2		0.62		
OS3		0.78		
Fit statistics: $\chi^2 = 8.33$, $df = 8$, $p = 0.40156$, $RMSEA = 0.021$, $CFI = 1.00$, $NFI = 0.96$, $NNFI = 0.99$, $GFI = 0.97$				

Clinical IT Sophistication. Paré and Sicotte's (2001) Information Technology Sophistication Instrument was adapted to measure clinical IT sophistication. The instrument was later further validated in other empirical tests by Jaana, Ward, Paré, and Sicotte (2006), and Jaana, Ward, Paré, and Wakefield (2005). Paré and Sicotte (2001) argue that clinical IT sophistication can be assessed within three clinical domains: (1) patient management; (2) patient care activities; and (3) clinical support activities. Each of

these domains and their subsections contains sets of questions that investigate different conceptual dimensions of clinical IT sophistication: functional sophistication, technological sophistication, and integration level. The “patient management” domain consists of clinical IT applications related to admission/discharge /transfer applications and covers issues related to medical records. The “patient care activities” domain includes four subsections that assess computer-based applications and technologies supporting physicians, nurses, the emergency department, and the operating suite. The “clinical support activities” section investigates clinical IT applications and technologies present in laboratories, radiology and pharmacy.

Initially, Paré and Sicotte (2001) addressed IT sophistication by measuring functional sophistication, technological sophistication, and integration level separately. Functional sophistication was measured using binary questions; a score of 1 was assigned for each computerized process, and a score of zero otherwise. Technological sophistication was measured on a Likert type scale that examines the frequency of the utilization of certain specific technology. Integration level was measured by a set of questions assessing the level of internal and external integration of the various computerized systems and applications in each clinical subsection on a 1-7 scale ranging from “not at all” to “very much”. Due to space limitations, we did certain revisions, combining the three measures together, and estimated the clinical IT sophistication by investigating the processes and activities in the above mentioned three clinical domains that involve the use of computer-based applications and specific technologies in clinical areas. We believe the number of computerized functions could serve as a reasonable indicator for the clinical IT sophistication of a hospital, as the more the setup of the

computerized functions, the more the deployable IT application and the richer the clinical IT technology pool available to address different clinical domains (tapping into functional sophistication and technological sophistication). The multiple configuration of clinical IT also makes possible the internal and external integration of the various computerized systems and applications (tapping into integration sophistication). Additionally, we believe that, in reality, it is hard to distinguish between technology's functional sophistication and technological sophistication. The amount of use of certain specific technology also depends, to a great extent, on patient visiting and patient preference, and is far beyond the endogenous control by the hospital, and therefore should not be considered as a reliable and valid measure of technical sophistication. Finally, in the adapted measures, the objective numerical indicators were used to substitute for the original subjective one in order to avoid perception prejudice.

Technical and Managerial Legitimacy. Ruef and Scott (1998) distinguished between two levels of legitimization efforts within health care organizations, and proposed that the types of procedures may be distinct by different normative sources. One is managerial legitimacy that involves normative support for organizational mechanisms such as personnel management, accounting practices, and rules of conduct and structure of the administrative staff. Another is technical legitimacy that focuses on core technology, including normative support for staff qualifications, training programs, work procedures, and quality assurance mechanisms.

Following a similar logic of analysis and operationalization procedures, we measured technical legitimacy and managerial legitimacy by examining the approval codes received by the hospitals from approving bodies, with each approval

operationalized as a binary variable. We retained fourteen approval codes from the American Association Guide. Following the empirical steps from Ruef and Scott (1998), we consider the fourteen sources of normative legitimization, with six focusing primarily on technical aspects of hospital activities, and eight on managerial aspects. The 14 normative sources are listed in Table 3-3.

Table 3-3: Approval Codes as Indicator of Hospital Legitimacy

Approval Code	Form of Legitimacy
1. American Hospital Association (AHA) membership	Managerial legitimacy
2. Blue Cross and Blue Shield Association	Managerial legitimacy
3. American Osteopathic Association	Managerial legitimacy
4. Certified for participation in the Health Insurance for the Aged (Medicare) Program by the U.S. Department of Health and Human Services	Managerial legitimacy
5. Critical Access Hospitals	Managerial legitimacy
6. Rural Referral Center	Managerial legitimacy
7. Sole Community Provider	Managerial legitimacy
8. Accreditation by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO)	Managerial legitimacy
9. Cancer program approved by American College of Surgeons (ACS)	Technical legitimacy
10. Approval for residency training by the Accreditation Council for Graduate Medical Education (ACGME)	Technical legitimacy
11. Medical School Affiliation, reported to American Medical Association	Technical legitimacy
12. Hospital-controlled professional nursing school, reported by National League for Nursing	Technical legitimacy
13. Accreditation by Commission on Accreditation of Rehabilitation Facilities	Technical legitimacy
14. Member of Council of Teaching Hospitals of the Association of American Medical Colleges	Technical legitimacy

EFA was conducted to verify the classification of technical and managerial legitimacy. Using principal components extraction with direct oblique and minimum rotation, we identified 14 indicators with eigenvalues greater than one. The factor loadings for technical and managerial legitimacy are shown in Table 3-4. As anticipated, the 14 approval codes cluster into two groups, with one corresponding to the normative legitimacy associated with technical functions, and the other corresponding to the normative legitimacy associated with managerial functions. Hence, technical legitimacy and managerial legitimacy were calculated by summing the binary variables of approval codes for each group.

Table 3-4: Rotated Factor Solution for Technical and Managerial Legitimacy

	Factor 1 Technical Legitimacy	Factor 2 Managerial Legitimacy
1. Cancer program approved by American College of Surgeons (ACS)	.924	
2. Approval for residency training by the Accreditation Council for Graduate Medical Education (ACGME)	.904	
3. Medical School Affiliation, reported to American Medical Association	.677	
4. Hospital-controlled professional nursing school, reported by National League for Nursing	.621	
5. Accreditation by Commission on Accreditation of Rehabilitation Facilities	.613	
6. Member of Council of Teaching Hospitals of the Association of American Medical Colleges	.560	
7. American Hospital Association (AHA) membership		.773
8. Blue Cross and Blue Shield Association		.765
9. American Osteopathic Association		.674
10. Certified for participation in the Health Insurance for the Aged (Medicare) Program by the U.S. Department of Health Human Services		.536
11. Critical Access Hospitals		.468
12. Rural Referral Center		.423
13. Sole Community Provider		.410
14. Accreditation by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO)		.780

A Hospital's Regulatory Agency Ties. We operationalized a hospital's regulatory agency ties as the count of membership or accreditation of the sample hospital under certain regulatory agencies. As illustrated by prior work (e.g., D'Aunno, Succi, & Alexander, 2000; D'Aunno, Sutton, & Price, 1991), organizations make efforts to establish legitimacy or at least manipulate stakeholders' perception of such legitimacy by building up relational ties with regulatory agencies that control resource flow and distribution, and create cultural and regulatory expectations.

Core and Periphery Organization. The core organizations of a field are those at the top of the status hierarchy that other organizations tend to mimic. In the field of profession dominance, large organizations represent such a category (Cooper et al., 1996). Large organizations possess a "distinctive institutional character" (Galanter & Palay, 1991): they are the prominent organizations through which most members obtain their on-the-job socialization; and they are exemplars that other organizations tend to emulate. Following Cliff, Jennings, and Greenwood (2006), we distinguish core and periphery organizations by the organizational size. Specifically for the hospitals, the number of total beds was used to indicate a hospital's operation capacity.

Perceived Organizational Competence. Following Karagozoglu and Brown (1988), perceived organizational competence was measured by asking respondents to rate their organization's current performance on a 7-point Likert scale ranging from "Very Unsatisfied" to "Very Satisfied". Sample items of the 5 performance criteria are: the ability to attract and retain high-level human resources, prestige of the organization, innovation, quality of health care products/services, etc. The average of all criterion scores indicates the perceived organizational competence. As perceived organizational

competence is a formative construct, and that the organization is competent in one aspect does not necessarily lead to the competence in other areas, we do not expect reliability estimation and factor analysis (MacCallum & Browne, 1993).

Organizational Efficiency. As the assessment of organizational efficiency focuses on the cost side of organizational activities, and emphasizes the accomplishment of a maximum output at a minimum expenditure of time and effort, we used financial measure revenue to reflect such examination by assessing the return or yield of a hospital from any kind of property, patent, service, etc. in a certain period of time. The use of the archival data provides an objective measure for evaluating organizations' financial performance ranking across the industry, and avoids the possible bias of common method variance.

Innovation Capability/innovativeness. Organizational flexibility was assessed by investigating a hospital's innovation capability, as we believe that an organization's capability to innovate and bring in new products/services is an important indicator and antecedent that an organization can adapt flexibly. Innovation capability was operationalized using a 4-item Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The measure was developed by Hurley and Hult (1998), and was later used by Luo, Sivakumar, and Liu (2005). The measure was designed to capture the organization's ability to develop and implement new ideas, products, and processes in order to bring new technology into use (Han, Kim, & Srivastava, 1998). A Chronbach Alpha coefficient was 0.718, indicating an acceptable internal consistency of the measures. EFA with direct oblimin rotation using Kaiser criterion of eigenvalue greater

than 1 verified the measurement structure. The mean score, averaged across the four items, assesses innovation capability.

To carry out our analysis about the conservative vs. entrepreneurial modes of adaptation, we need to split the sample into two groups which are unambiguously conservative and entrepreneurial. Following Miller and Friesen (1982), three dimensions are used to achieve this: innovation capability/innovativeness, proactiveness, and risk-taking. Miller and Friesen (1982) created their own cutoff values: Organizations whose scores on the three dimensions averaged less than or equal to 3.5 on the 7-point scales were classified as conservative. Organizations whose score on three dimensions averaged greater than or equal to 4.5 on the 7-point scales were classified as entrepreneurial. Organizations with average scores of greater than 3.5 and less than 4.5 tended to be in a grey area. In our case, the averaged scores on the three dimensions ranged from 2.86 to 5.75 on the 7-point scales with the standard deviation 0.56, the score range not presenting sufficient variations. Nearly 93% of the cases scored more than 3.5, and thus did not provide enough cases for analyzing the conservative mode of adaptation. Therefore, Miller and Friesen's cutoff index does not apply to our study. Instead, we sorted the average scores on the three dimensions, and further divided the score range into three parts with equal percentiles. Hospitals in the percentile with smaller values were classified as conservative. These organizations tend to be risk averse and engage in relatively little product innovation. Hospitals in the percentile with larger values were classified as entrepreneurial. They present contrasting features to their conservative partners. Hospitals falling into the middle value group were regarded as being in a grey area. They manifested high in one of the dimensions, but low in one another dimension,

and therefore were deleted from the sub-sample analysis because they could not be unambiguously classified.

A total of 9 items were used to measure three dimensions: innovation capability/innovativeness, proactiveness, and risk-taking. These items were developed by Hurley and Hult (1998) and Covin and Slevin (1989), and further used by Covin and Slevin (1989) and Luo, Sivakumar, and Liu (2005); some items were added from Lumpkin and Dess (2001). As mentioned above, four items were derived to measure *innovation capability/innovativeness* and to examine an organization's strategic posture in terms of frequent and extensive technological and product/service innovation. *Proactiveness* was measured using 3 items with 7-point scales. The items ask about the organization's tendency to lead rather than follow in the development of new procedures and technologies, and about the organization's tendency to act in anticipation of future changes and needs. *Risk-taking* was measured using 2 items on a 7-point scale. The items examine top management's risk-taking propensity by asking about their tendency toward investments of high risk and high returns, and big opportunities with uncertain outcomes. The inter-item reliability coefficients for three dimensions were respectively: 0.75 for innovation capability/innovativeness; 0.74 for proactiveness; 0.781 for risk-taking. EFA with direct oblimin rotation using Kaiser criterion of eigenvalue greater than 1 produced three dominant factors with clear loadings above 0.4 on different factors, and justified the factor structure.

We further used CFA to evaluate the three-factor model and reflect the covariance matrix of the data. Although the three dimensions focus on different aspects of strategic posture, they are empirically related and may correspond to the three subscales of a

distinct factor on a higher level (Covin & Slevin, 1989). In the CFA, all factors in the present study were allowed to correlate freely. The specified measurement model was tested with fully standardized coefficients obtained from the maximum likelihood solution. The results from the three-factor CFA indicated that the factor structure provided an adequate fit ($\chi^2 = 12.36$, $df = 24$, $p = 0.97549$, $RMSEA = 0.000$, $CFI = 1.00$, $NFI = .95$). In general, factor loadings were moderate to high and all loadings were significant ($t \text{ stat} > 1.96$, $p < .05$). Table 3-5 presents AVE index and the details of the CFA analysis.

Table 3-5: CFA for Innovation Capability, Proactiveness, and Risk-Taking

Items and Factor Loadings	Innovation Capability (IC)	Proactiveness	Risk- Taking	AVE	CR
IC1	0.57			0.45	0.75
IC2	0.65				
IC3	0.94				
IC4	0.43				
Proactiveness1		0.76		0.48	0.74
Proactiveness2		0.64			
Proactiveness3		0.68			
Risk-taking1			0.80	0.64	0.78
Risk-taking2			0.80		
Fit statistics: $\chi^2 = 12.36$, $df = 24$, $p = 0.97549$, $RMSEA = 0.000$, $CFI = 1.00$, $NFI = 0.95$, $NNFI = 1.08$, $GFI = 0.97$					

Control variables. To avoid confounding effects we identified and controlled for some economic and organizational factors that may affect the practice of organizational adaptation. First, we controlled for hospital age and size as they represent the dominant structural inertial forces that may impact organizational adaptation. Organizational resistance to new practice increases monotonically with age and size (Hannan & Freeman, 1984). Following the dominant trend of hospital researchers (e.g., Ruef & Scott, 1998; D'Aunno, Succi, & Alexander, 2000), a focal hospital's age was

operationalized as the number of years since the founding of the hospital. With regard to hospital size, measures that have been frequently used are number of beds (a measure of capacity), total assets or revenue (a measure of resource), and number of personnel (a measure of work force). To detect the best measure for the present purpose, intercorrelations were calculated for the alternative size measures: beds, revenue, and total employees. A high correlation with the lowest value above 0.85 significant at the 0.01 level (two-tailed) indicated that these measures were highly related, and use of any of the alternative size measures could be justified on empirical grounds. We used total employees as the hospital size measure based on the following considerations: first, as total bed number has already been chosen to serve as one focus construct of the study to distinguish between core and periphery organization, we chose employee number as our control variable to avoid repetition, and involve as many influential factors as possible; second, controversy still exists as to employing the number of staffed beds or the number of licensed beds as the capacity measure (D'Aunno, Succi, & Alexander, 2000); third, assets or revenue measure may incur small variance issue given the non-profit feature of most hospitals; fourth, our present study focuses on the organizational adaptation practice, and human factor should play a major role during the process. Instead of using revenue as the hospital's size measure, we included revenue as our control variable to reflect the possible impacts of the financial factor on the hospitals' adaptation practice.

Data Analysis

Several steps were contained in our analysis. First, the reliability and validity of the measures were examined with the two-step approach suggested by Anderson and Gerbing (1988). We used confirmatory factor analysis with maximum likelihood

estimation to evaluate the validity of the multi-item measures. The CFA results were also verified by the EFA analysis with oblimin rotation and Principal Component Analysis (PCA) as extraction method. Second, multicollinearity was diagnosed by examining the variance inflation factors (VIFs) to rule out the possibility that multicollinearity might be a serious problem.

The thirteen hypotheses developed in this study were tested using a combination of univariate and multivariate techniques. Data were split into three parts with equal percentiles based on the average scores on three dimensions: innovation capability, proactiveness, and risk-taking. Thirty-eight cases with small average values in the upper percentile were used for the regression analysis of a conservative mode of adaptation; thirty cases with large average values in the lower percentile were used for the regression analysis of an entrepreneurial mode of adaptation; cases falling into the middle value percentile were deleted. Thus two groups that are unambiguously conservative and entrepreneurial were identified.

As the moderation relationship assessed by the interaction term method is vulnerable to the impacts of the small sample size, and subject to high Type II error rates, a researcher tends to conclude that there is no interaction/moderation effect in the sample when there actually is an interaction effect in the relevant population (Aguinis, 1995; 2002). Therefore, we used the sub-samples method to test the moderation relationship in H1 due to our small sample limit. Specifically, we created a categorical variable of hospital's perceived competence (moderator in H1) after deriving the average of all performance criterion scores, and median split the data for conservative organizations into two sub-samples composed of cases partitioned, respectively, into low and high

levels of hospital's perceived competence with equal percentiles. A change in the sign direction of the relationship between the technical environment turbulence and the clinical IT sophistication or a change in the magnitude of significant β coefficients associated with the relationship would prove a significant moderating role. This approach parallels traditional moderated regression analysis methods by testing a model separately for each sub-sample using unpaired t-tests (Avolio, Howell, & Sosik, 1999; Duxbury & Higgins, 1991; Sambamurthy & Chin, 1994).

In H2, a concave relationship (U-shaped relationship) between the technical environment turbulence and the structure organicity--strategy improvisation fit was proposed. The U-shaped relationship suggests that both the first-class and the second-class differentiation of technical environment turbulence to the fit variable are positive. Additionally, in order to control the possible correlation between the independent variable and its square term, both the first-class independent variable technical environment turbulence and its square term were mean-centered (Cohen, Cohen, West, & Aiken, 2003). Thus the proposed concave relationship was presented in the following formula. It is expected to find: $b_1 > 0$ and $b_2 > 0$, if the concave relationship is held true.

$$\text{Fit} = b_0 + b_1 * (\text{Technical Environment Turbulence} - \text{Mean of Technical Environment Turbulence}) + b_2 * (\text{Technical Environment Turbulence} - \text{Mean of Technical Environment Turbulence})^2$$

Hypotheses 3, 4, and 6 to 11 involved hierarchical regression analysis. Employee, hospital age, and revenue were entered as control variables, followed by the independent variables. For hypotheses of conservative mode of adaptation, hierarchical regression analysis was used to test the impacts of external technical and institutional environments

on the hospitals adaptation practice on both technical and managerial levels; for hypotheses of entrepreneurial mode of adaptation, hierarchical regression analysis was used to test the relationships in a direction from organization to environment, i.e., the impacts of hospitals adaptation activities on the technical and managerial levels on the external technical and institutional environments.

Hypotheses 5, 12, and 13 involved mean comparison of two groups. One-way ANOVA was used to estimate whether the group difference is due to the error or to the true between-group variance by the proposed influential factor (the categorical independent variable). In H5, as a hospital's bed number was used to reflect the market position of a hospital as core organization or peripheral organization, we created a categorical variable of hospital's bed, and median split the data for conservative organizations into two groups composed of cases partitioned, respectively, into low and high levels of hospital's bed number with equal percentiles. Similarly, for hypotheses 12 and 13, two groups that are unambiguously conservative and entrepreneurial were identified by splitting the data into three parts with equal percentiles based on the average scores on three dimensions: innovation capability, proactiveness, and risk-taking. The groups in the upper and lower percentile represented the conservative and entrepreneurial categories respectively. The two groups were thus compared for the mean values on financial performance and innovation capability respectively. A significant F statistics in the ANOVA analysis would indicate that the means differ. The strength of the relationship was evaluated by η^2 (eta-squared) and ω^2 (omega-squared) indexes that reflect the proportion of variance in the dependent variable due to the independent variable, or the effect size. For all the mean comparison hypotheses, unpaired t -tests were

also conducted to verify the ANOVA results with both equal variance and unequal variance assumed.

CHAPTER IV

RESULTS OF ANALYSIS

CFA and Descriptive Statistics

A discussion and report of CFA results along with the original item loadings, the reliability estimates, as well as the selected fit index was provided in Tables 3-1, 3-2, 3-4, and 3-5. All composite reliability coefficients were above 0.70, indicating adequate internal consistency (Nunnally, 1978). The CFA results showed that convergent validity of the multi-item measures existed when all path estimates from latent constructs to their corresponding manifest indicators were significant (i.e., t -statistics > 1.96). For each set of measures, results also indicated the evidence of discriminant validity when the average variance extracted (AVE) for each measure was greater than the squared structural link between the two measures (Fornell & Larcker, 1981). The overall Goodness-of-Fit statistics of CFA results showed evidence to support the validity of the measurement models based on criterion such as CFI, NFI, and RMSEA. In general, all the constructs had an adequate fit for the data and the CFAs confirmed the previously proposed factor structures for all the constructs. In addition to CFA, the measurement structure was also verified by EFA with direct oblimin rotation using Kaiser criterion of eigenvalue greater than 1.

As we ran two separate sets of regressions for conservative and entrepreneurial organizations respectively, the means, standard deviations, and correlations for two groups of variables were reported in Table 4-1 and Table 4-2.

Table 4-1: Means, Standard Deviations, and Correlation Coefficients for Conservative Mode of Adaptation (N=38)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mean	217.68	730.71	64.79	4E+008	6.11	4.79	4.24	3.00	5.36	4.31	30.63	1.18	2.82	1.18	4.22	4.12	4.35	6.21
SD	191.67	1017.41	30.66	428435050.3	0.61	0.54	0.68	0.94	1.01	1.14	10.00	0.96	0.90	0.73	0.97	0.72	0.92	0.67
1. Bed	1																	
2. Employee	.93**	1																
3. Hospital Age	.33**	.25	1															
4. Revenue	.93**	.84**	.30	1														
5. Technical Turbulence	-.56**	-.54**	-.08	-.60**	1													
6. Innovation Capability	.30	.27	-.02	.21	-.28	1												
7. Proactiveness	.60**	.57**	.15	.54**	-.48**	.58**	1											
8. Risk-taking	-.37**	-.28	-.13	-.40*	.21	-.16	.03	1										
9. Human Capital	.05	.05	.04	-.04	.29	-.08	-.05	.17	1									
10. Slack	.23	.11	.15	.12	-.15	.24	.34*	.04	-.02	1								
11. IT Sophistication	.26	.25	.18	.24	-.44**	.36*	.41*	.12	-.13	.41*	1							
12. Technical Legitimacy	.84**	.80**	.29	.79**	-.55**	.23	.50**	-.11	.18	.16	.40**	1						
13. Managerial Legitimacy	.08	.12	-.14	.02	-.01	.14	.28	.00	.02	.11	.23	.10	1					
14. Regulatory Agency Ties	.37**	.33*	.18	.36*	-.05	.08	.24	-.22	.05	-.08	.14	.34	.26	1				
15. Perceived Competence	.21	.14	.47**	.11	.11	-.14	.14	.12	.44**	.53**	.003	.22	.16	.06	1			
16. Strategy Improvisation	-.47*	-.46**	-.35*	-.42**	.16	-.23	-.23	.33*	.17	-.06	.16	-.24	.06	-.16	-.28	1		
17. Structure Organicity	-.51*	-.57**	.07	-.34*	.02	-.07	-.23	.20	-.21	-.02	.17	-.35*	-.15	-.17	-.08	.24	1	
18. Fit	.11	-.09	-.12	.10	.08	-.13	-.04	.05	.01	-.27	-.41*	.03	-.08	.16	-.13	-.03	-.41*	1

Notes: ** correlation is significant at the .01 level (2-tailed); * correlation is significant at the .05 level (2-tailed);

Table 4-2: Means, Standard Deviations, and Correlation Coefficients for Entrepreneurial Mode of Adaptation (N=30)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mean	136.97	524.97	57.10	2E+008	6.10	5.61	5.24	4.43	5.21	4.71	30.03	0.97	2.80	1.07	4.5 6	4.61	4.87	6.23
SD	73.79	346.37	24.57	208115487.2	0.61	0.46	0.49	0.69	0.56	0.84	8.22	0.67	0.96	0.79	0.5 6	0.74	0.74	0.53
1. Bed	1																	
2. Employee	.57**	1																
3. Hospital Age	-.11	-.15	1															
4. Revenue	.69**	.48**	-.32	1														
5. Technical Turbulence	.05	.08	.18	-.10	1													
6. Innovation Capability	.43*	.28	-.30	.41*	.18	1												
7. Proactiveness	-.31	.09	-.02	.03	-.05	-.06	1											
8. Risk-taking	-.10	-.14	.07	-.20	.02	-.33	-.29	1										
9. Human Capital	.17	.05	.17	.05	.24	.23	-.05	.11	1									
10. Slack	-.11	.03	-.26	.13	.24	.39*	.42*	-.35	.16	1								
11. IT Sophistication	.11	-.01	-.35	-.04	-.15	.01	-.39*	.19	-.17	-.40*	1							
12. Technical Legitimacy	.48**	.38*	-.07	.43**	.26	.18	-.22	.11	.29	-.02	.18	1						
13. Managerial Legitimacy	-.10	-.09	-.42*	-.21	.39*	.09	-.04	.01	-.07	.21	.25	.20	1					
14. Regulatory Agency Ties	.06	.12	-.05	.13	.13	.29	.34	-.34	.25	.53**	-.57**	-.06	.25	1				
15. Perceived Competence	.01	.08	.10	.21	.30	.13	.38*	-.26	.30	.63**	-.42*	-.02	.15	.56**	1			
16. Strategy Improvisation	.03	-.06	-.02	.01	-.09	-.36	-.34	.27	.23	-.25	.14	.25	-.16	-.27	-	1		
17. Structure Organicity	.01	.18	.13	.06	.05	.14	-.14	-.15	.13	.05	-.17	-.17	-.31	.24	.16	.24	1	
18. Fit	.23	.08	-.07	.19	.08	.01	-.27	.06	.39*	-.32	.28	.44*	-.03	-.16	-	.43*	-.08	1

Notes: ** correlation is significant at the .01 level (2-tailed); * correlation is significant at the .05 level (2-tailed).

The first step in analyzing the descriptive statistics was to check correlations between independent variables for potential multicollinearity problems which might arise in the regressions. When independent variables with significant correlations were used in the same regression, the variance inflation factor would be used to assess the multicollinearity problem (Neter, Waseman, & Kutner, 1985). The variance inflation factor (VIF) provides an indication of the extent to which “the variance of the estimated regression coefficients are inflated as compared to when the independent variables are not linearly associated” (Neter, Waseman, & Kutner, 1985, p391). A single VIF coefficient in excess of 10, or a mean VIF substantially larger than 1, is indicative of serious multicollinearity problems (Neter, Waseman, & Kutner, 1985). The correlation matrix in Table 4-1 showed that significant negative correlation existed between technical environment turbulence and technical legitimacy ($r=-.55$, $p<.001$). Therefore, VIF index would be assessed later for the possibility of multicollinearity. Other correlation coefficients in Table 4-1 and Table 4-2 did not show large and significant relations existing among our independent variables. The correlation coefficients among independent variables that would be potentially used in the same regression varied from 0.01 to 0.28, non-significant. Therefore, multicollinearity was not a serious threat for other independent variables in our study.

The second step in analyzing the correlation matrices is to provide a preliminary examination of the correlation pattern and magnitude between our proposed independent and dependent variables. In Table 4-1, as expected, clinical IT sophistication was negatively significantly correlated with technical environment turbulence ($r=-.44$, $p<.001$), and positively significantly correlated with technical legitimacy ($r=.40$, $p<.001$).

Contrary to our proposition, fit between structure organicity and strategy improvisation did not show significant correlations with either technical environment turbulence or managerial legitimacy. In Table 4-2, the correlation matrix showed statistically significant correlation in the direction expected between clinical IT sophistication and unabsorbed slack ($r=-.40$, $p<.001$). Clinical IT sophistication was also significantly correlated with regulatory agency ties, but in a direction opposite to our proposition ($r=-.57$, $p<.001$). Clinical IT sophistication did not show significant correlations with either technical environment turbulence or technical legitimacy, which was the feature in contrast with what we found in the correlation matrix for the conservative hospitals. Fit between structure organicity and strategy improvisation was positively significantly associated with human capital ($r=.39$, $p<.05$), as proposed. Yet the Fit variable did not show significant association with managerial legitimacy.

Model Estimation

Data were split with equal percentiles to form unambiguously conservative and entrepreneurial groups. Hypotheses 1-5 address how hospitals with a conservative mode of adaptation react to the impacts from the external technical and institutional environments. Thirty-eight cases with small average values in the upper percentile were used for the regression analysis of the conservative mode of adaptation. Hypotheses 6-11 address entrepreneurial hospitals' proactive impacts on the external technical and institutional sectors. Thirty cases with large average values in the lower percentile were used for the regression analysis of entrepreneurial mode of adaptation. The two groups with 68 cases were then compared to assess their financial performance and innovation capability, as indicated in hypotheses 12 and 13.

H1 predicted a negative relationship between technical environment turbulence and clinical IT sophistication, and this relationship was moderated by the hospital's perceived organizational competence. As mentioned above, we used the sub-samples method to test the moderation relationship due to the small sample limit. We also included technical legitimacy in the first step of regression, in addition to three control variables, to assess the VIF index and control for the possibility of the multicollinearity issue between technical environment turbulence and technical legitimacy. The analysis results were reported in Table 4-3. As expected, technical environment turbulence was negatively related to clinical IT sophistication ($\beta = -.434, p < .05$); and inclusion of technical environment turbulence into the model after all the control variables and the potentially influential factor technical legitimacy were entered led to a significant increased R^2 by .115 ($p < .05$). The single VIF indices for technical environment turbulence and technical legitimacy were respectively 3.234 and 1.636, less than the cutoff value 10; the mean of VIF was not significantly larger than 1. Therefore, the multicollinearity between technical environment turbulence and technical legitimacy did not pose a serious threat in our case.

The moderation effects of perceived organizational competence were assessed by comparing changes in β coefficients regarding the sign direction and coefficient magnitude after regressing technical environment turbulence on clinical IT sophistication in two sub-samples. Table 4-3 showed that, under the low perceived competence level, no significant relationship between technical environment turbulence and clinical IT sophistication existed. In contrast, under the high perceived competence level, technical environment turbulence was negatively related to clinical IT sophistication ($\beta = -.997, p$

< .05); and inclusion of technical environment turbulence into the model after controlling all the potentially influential variables, caused R^2 to increase significantly by .230 ($p < .05$). Therefore, H1 was supported.

Table 4-3: Hierarchical Regression Beta Results for Technical Environment Turbulence Effects on Clinical IT Sophistication

	<u>Direct Effects</u>		<u>Perceived Organizational Competence as Moderator</u>			
	All cases		Competence -- Low		Competence -- High	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Employee	-.081	-.096	.065	.041	-.545	-.663
Hospital Age	.086	.138	.040	.001	.434 ⁺	.548 [*]
Revenue	-.164	-.358	-.320	-.376	.150	.049
Technical Legitimacy	.564 ⁺	.476 ⁺	.547 ⁺	.549 ⁺	.762	.070
Technical Environment Turbulence		-.434 [*]		-.189		-.997 [*]
R^2	.179	.294	.249	.277	.439	.668
Adjusted R^2	.079	.184	.072	.051	.235	.502
$R^2 \Delta$.115		.028		.230
F value	1.797	2.666 [*]	1.408	1.224	2.150	4.030 [*]
F change($R^2 \Delta$)		5.222 [*]		.615		6.922 [*]
d.f.	4	5	4	5	4	5
Note: 1. ⁺ $p < .1$, [*] $p < .05$, ^{**} $p < .01$, ^{***} $p < .001$.						

H2 predicted a curvilinear relationship between the technical environment turbulence and the fit between the structure organicity and the strategy improvisation. Both the first-class independent variable technical environment turbulence and its square term were mean-centered (Cohen, Cohen, West, & Aiken, 2003) to control for their mutual correlation. Managerial legitimacy was included in the first step of the hierarchical regression along with other control variables due to its expected relationship with the fit variable. Contrary to our proposition, Table 4-4 suggested that no significant curvilinear relationship existed between technical environment turbulence and the fit variable.

Table 4-4: Hierarchical Regression Beta Results for Technical Environment Turbulence Effects on the Fit between Structure Organicity and Strategy Improvisation

	Step 1	Step 2
Employee	.107	-.022
Hospital Age	-.212	-.209
Revenue	.230	.254
Managerial Legitimacy	-.127	-.106
Technical Environment Turbulence	.258	-3.270
Squared Technical Environment Turbulence		3.481
R ²	.089	.131
Adjusted R ²	-.053	-.037
R ² Δ		.042
F value	.627	.778
F change(R ² Δ)		1.482
d.f.	5	6
Note: 1. + p < .1; * p < .05; ** p < .01; *** p < .001.		

H3 and H4 proposed the impacts of institutional environments on conservative hospitals' adaptation practice. Table 4-5 presented the hierarchical regression results. As indicated in the table, technical legitimacy was significantly positively related to clinical IT sophistication at the .1 level ($\beta = .476, p < .1$); the inclusion of the independent variable technical legitimacy after controlling for all the potential influential variables lead to an increase of R² by .070, still significant at .1 level. Therefore, we concluded that H3 was partially supported at the .1 level. Opposite to our proposition, Table 4-5 did not suggest a significant relationship between managerial legitimacy and the fit between structure organicity and strategy improvisation. Thus H4 was not supported.

Table 4-5: Hierarchical Regression Beta Results for Legitimacy Effects (H3 and H4)

	Dependent Variables			
	Clinical IT Sophistication		Fit	
	Step 1	Step 2	Step 1	Step 2
Employee	.114	-.096	.061	.107
Hospital Age	.170	.138	-.192	-.212
Revenue	-.199	-.358	.255	.230

Technical Environment	-.483*	-.434*	.252	.258
Technical Turbulence				
Technical Legitimacy		.476 +		
Managerial Legitimacy				-.127
R ²	.224	.294	.074	.089
Adjusted R ²	.130	.184	-.038	-.053
R ² Δ		.070 +		.015
F value	2.380	2.666	.661	.627
F change(R ² Δ)		3.180 +		.531
d.f.	4	5	4	5
Note: 1. + p < .1; * p < .05; ** p < .01; *** p < .001.				

H5 involved a mean comparison of institutional legitimacy due to a hospital's market position (at the core or periphery of the field). A categorical variable of hospital beds was created to reflect the market position of a hospital as a core organization or a peripheral organization. One-way ANOVA was used to estimate whether the true group difference existed due to hospitals' different market position. ANOVA results were presented in Table 4-6. The mean legitimacy for periphery hospitals was 3.33; the mean legitimacy for core hospitals was 4.43. The hospitals at the core of the field have stronger institutional legitimacy than the hospitals at the periphery of the field. The difference was significant at .05 level, as indicated in Table 4-6. The strength of the relationship was evaluated by η^2 (eta-squared) and ω^2 (omega-squared) indexes that reflect the proportion of variance in the dependent variable due to the independent variable, or the effect size. In our case, η^2 was .157; ω^2 was .131. Both indices indicated a reasonable effect size. Unpaired *t*-tests were further conducted to verify the ANOVA results. T-test for equality of means failed to support the mean equality: $t = -2.593$ ($p < 0.05$) with equal variance assumed, and $t = -2.862$ ($p < 0.01$) with equal variance not assumed. Therefore, H5 was supported.

Table 4-6: ANOVA Results for Mean Comparison of Institutional Legitimacy (H5)

Source of Variance	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Market Position (Core vs. Periphery)	11.014	1	11.014	6.722	.014
Error	58.986	36	1.638		
Total	70.000	37			

H6 to H9 proposed the impacts of clinical IT sophistication of entrepreneurial hospitals on the technical and institutional environments respectively. Table 4-7 presented the hierarchical regression results. Table 4-7 did not suggest a significant relationship between clinical IT sophistication and technical environment turbulence; H6 was not supported. With regulatory agency ties as dependent variable, Table 4-7 showed that the inclusion of clinical IT sophistication into the model after all the control variables were entered led to a significant increased R^2 by .340 ($p < .01$); clinical IT sophistication was significantly related to regulatory agency ties ($\beta = -.666$, $p < .01$), but in a direction opposite to our proposition. Thus H7 was partially supported. With unabsorbed organizational slack as a dependent variable, clinical IT sophistication was significantly negatively related to slack ($\beta = -.487$, $p < .05$); the inclusion of clinical IT sophistication into the model after controlling for all the control variables led to an increased R^2 by .182 ($p < .05$). Thus H8 was supported. With technical legitimacy as a dependent variable, clinical IT sophistication was positively related to technical legitimacy, in a direction as proposed, but the relationship was not significant. Thus H9 was not supported.

Table 4-7: Regression Beta Results for Impacts of Clinical IT Sophistication (H6-H9)

	Dependent Variables			
	Technical Environment Turbulence	Regulatory Agency Ties	Unabsorbed Organizational Slack	Technical Legitimacy

	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Employee	.164	.167	.077	.089	-.042	-.033	.238	.235
Hospital Age	.162	.098	-.006	-.272	-.242	-.437*	.082	.143
Revenue	-.139	-.176	.131	-.023	.138	.025	.276	.311
Fit	.103	.151	-.186	.013	-.354 ⁺	-.208	.370*	.324 ⁺
Clinical IT Sophistication		-.160		-.666**		-.487*		.152
R ²	.063	.083	.056	.396	.190	.372	.366	.384
Adjusted R ²	-.087	-.108	-.095	.270	.060	.241	.265	.255
R ² Δ		.020		.340**		.182*		.018
F value	.422	.434	.372	3.147*	1.464	2.842*	3.608	2.990
F change(R ² Δ)		.514		13.501**		6.961*		.693
d.f.	4	5	4	5	4	5	4	5
Note: 1. ⁺ p < .1, * p < .05, ** p < .01, *** p < .001.								

H10 and H11 predicted the impacts of fit between structure organicity and strategy improvisation in entrepreneurial hospitals. Table 4-8 presented the hierarchical regression results. With human capital as dependent variable, Table 4-8 showed that the fit variable was positively significantly related to human capital ($\beta = .475$, $p < .05$); the inclusion of the fit variable into the regression after controlling for all potential influential variables led to an increased R² by .196 ($p < .05$). Thus H10 was supported. With managerial legitimacy as a dependent variable, the fit variable was positively related to managerial legitimacy, in a direction as proposed, but the relationship was not significant. Thus H11 was not supported.

Table 4-8: Regression Beta Results for Impacts of Fit Variable (H10 and H11)

	Dependent Variables			
	Human Capital		Managerial Legitimacy	
	Step 1	Step 2	Step 1	Step 2
Employee	.039	.048	.011	.011
Hospital Age	.163	.102	-.526*	-.524*
Revenue	.079	-.041	-.385 ⁺	-.382 ⁺
Clinical IT Sophistication	-.108	-.268	.048	.051
Fit		.475*		-.010

R ²	.052	.247	.313	.313
Adjusted R ²	-.100	.090	.203	.170
R ² Δ		.196 *		.000
F value	.340	1.576	2.843	2.184
F change(R ² Δ)		6.238 *		.003
d.f.	4	5	4	5
Note: 1. + p < .1, * p < .05, ** p < .01, *** p < .001.				

H12 and H13 related to the mean comparison of organizational efficiency (revenue used as the indicator of financial performance) and organizational flexibility (innovation capability) between conservative and entrepreneurial hospitals. Unambiguously conservative and entrepreneurial groups were identified by splitting the data into three parts with equal percentiles based on the average scores on three dimensions: innovation capability, proactiveness, and risk-taking. The first percentile and the third percentile represented conservative and entrepreneurial groups respectively. One-way ANOVA was used to estimate whether the true group difference existed between conservative and entrepreneurial hospitals. The mean comparison of organizational efficiency was reported in Table 4-9. The mean revenue for conservative hospitals was 4E+008; the mean revenue for entrepreneurial hospitals was 2E+008. The hospitals with a conservative mode of adaptation have higher financial performance (indicated by revenue) than hospitals with an entrepreneurial mode of adaptation. As indicated in Table 4-9, the difference was significant at .05 level. The effect size of the relationship was assessed by η^2 and ω^2 : η^2 was .79, and ω^2 was .568 for this case. Unpaired *t*-tests were further conducted to verify the ANOVA results. T-test for equality of means failed to support the mean equality: $t = 2.375$ ($p < 0.05$) with equal variance assumed, and $t = 2.557$ ($p < 0.05$) with equal variance not assumed. Thus H12 was supported.

Table 4-9: ANOVA Results for Mean Comparison of Financial Performance (H12)

Source of Variance	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Conservative vs. Entrepreneurial	7E+017	1	6.877E+017	5.640	.020
Error	8E+018	66	1.219E+017		
Total	9E+018	67			

The mean comparison of organizational flexibility was presented in Table 4-10. The mean innovation capability for conservative hospitals was 4.7895; the mean innovation capability for entrepreneurial hospitals was 5.6083. The hospitals with an entrepreneurial mode of adaptation have higher innovation capability than hospitals with a conservative mode of adaptation. As indicated in Table 4-10, the difference was significant at .01 level. The effect size of the relationship was assessed by η^2 and ω^2 : η^2 was .389, and ω^2 was .385 for this case. Unpaired *t*-tests were further conducted to verify the ANOVA results. T-test for equality of means failed to support the mean equality: $t = -6.601$ ($p < 0.001$) with equal variance assumed, and $t = -6.724$ ($p < 0.001$) with equal variance not assumed. Thus H13 was supported.

Table 4-10: ANOVA Results for Mean Comparison of Innovation Capability (H13)

Source of Variance	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Conservative vs. Entrepreneurial	11.241	1	11.241	43.575	.000
Error	17.026	66	.258		
Total	28.267	67			

CHAPTER V

CONCLUSIONS AND GENERAL DISCUSSIONS

Discussions of Study Findings

The paper proposes a configurational framework of an organization-environment interaction model by examining two different adaptation modes, respectively characterized as the conservative mode of strategic reactivity, and the entrepreneurial mode of strategic proactivity. Specifically, we propose that organizations with two different adaptation modes will form distinct interactive relationships with the external environment. The relationship is particularly presented as diverse patterns of linkages between adaptive behaviors at different functional levels (technical and managerial levels) and various environmental sectors. We finally assume equifinality for performance implication, and propose that both the conservative and the entrepreneurial mode of adaptation will contribute to organizational effectiveness, with emphasis on different aspects of organizational performance.

The configuration approach elaborates two contrasting models of adaptation intent that emerged. The two adaptation models represent at two extremes the extent to which an organization focuses on internal maintenance and external positioning. The conservative model centers on the problem of maintaining strategic alignment, and the extent to which activities are smoothed and integrated within the organization to enhance efficiency. The entrepreneurial one centers on the problem of leveraging resources, and

emphasizes competition and achieving differentiation in the marketplace. The two are not mutually exclusive, but they represent a significant difference in emphasis, an emphasis that deeply affects how competitive battles get played out over time, and demonstrates a picture that distinguishes one from the other. For example, both models recognize the problem of competing in a hostile environment with limited resources. While the emphasis in the conservative model is on trimming ambitions to match available resources, the emphasis in the entrepreneurial model is on leveraging resources to reach seemingly unattainable goals. Both models recognize that relative competitive advantage determines relative profitability. The conservative model emphasizes the search for advantages that are inherently sustainable by conforming to the environmental change, or simply by searching for niches. The entrepreneurial model emphasizes the need to accelerate organizational learning to outpace competitors in building new advantages, and produces a quest for new rules that can devalue competitors' advantage.

We proposed 13 hypotheses to test our research framework. In summary, 6 hypotheses (H1, H5, H8, H10, H11, and H12) found full support; 1 hypothesis (H3) was significant at the 0.1 level, and 1 hypothesis found significant relationship between our proposed variables, but in a direction opposite to our expectation (H7); the 5 remaining hypotheses did not find statistical support. The major findings in the study are: (a) as a reactive respondent to the external environmental change, conservative hospitals' internal technology sophistication is negatively related to the degree of technical environment turbulence. However, this relationship is moderated by the organization's self perceived competence; the stronger the perceived organizational competence, the weaker the influence from the external technical environment; (b) in terms of the impacts from the

institutional environment on the conservative hospitals, the hospital's market position (at the core or the periphery of the field) plays a more significant role in determining an organization's legitimacy orientation than the direct effects from the institutional environment; and (c) as a proactive market actor, an entrepreneurial hospital's external exploring activities have a significant influence on the organization's internal maintenance and integration, which could be indicated by the full utilization of the organization's slack resource, and the employment and exploration of the organization's human capital.

Findings for organizations with a conservative mode of adaptation

One of the consistent findings in the early conservative adaptation literature is that external technical uncertainties affect the level of change by conservative organizations (e.g., Pierce & Delbecq, 1977; Ettlie, 1983). In face of the overly turbulent technical environment, conservative hospitals may adopt the simplicity-response technique by simplifying their technology structures or by making no change at all (Downey & Slocum, 1975) due to the immature technological standards of the industry and the difficulty of forecasting the technological environment. This inability to make major changes or tolerance of the environmental turbulence is also due to organizational inertia or emotional attachment to organizational routine (Miller & Friesen, 1980). However, the tolerance of the environmental turbulence may be challenged by the increasing threat to organizational competence or the long-term viability resulting from the technical environment change. As a result, conservative hospitals' adherence to their previous clinical technological routines may be reshaped by the salient influential factor perceived organizational competence. Consistently, the data analysis results indicated that, as

hypothesized, the more turbulent the technical environment, the less sophisticated the conservative hospitals' clinical IT configuration. However, the lower the perceived organizational competence, the weaker the negative impacts from the technical environmental turbulence. That is, conservative hospitals are more likely to make changes and to improve the hospital's clinical IT sophistication when the organization's perceived competence is threatened as a result of the turbulent technical environment. These findings are consistent with Karagozoglu and Brown's (1988) observation that if a placid environment becomes turbulent, for example, as a result of new technology, conservative organizations may experience a "nonaligned" relationship with the external environment requirements due to their propensity to resist change and avoid risks. Conservative organizations are expected to maintain their status quo as long as their organizations' perceived competence is at satisfactory levels. However, as they perceive a decline in organizational competence, they will respond by emphasizing higher rates of change.

It was also expected that conservative organizations' alignment efforts stimulated by the technical environment change would occur at the managerial level, and relate to the structure adjustment and strategy reorientation in a way that organic structure gradually emerged matched with the improvised strategy style. Particularly, the achievement of fit between structure organicity and strategy improvisation follows a hierarchical time ordering or path based on the relative costliness of the resulting organizational changes (Carter, 1990; Cook et al., 1983). As accommodating structure alternation and disrupting the core operation structure cannot be completed in a short time, it was expected that in the beginning the degree of structure organicity might not

match with the strategy improvisation level, and the misbalance would be finally eliminated by the achievement of structure-strategy congruence. However, this proposed concave relationship did not find statistical support from our data. One possible explanation for the contrary finding is that our cross sectional research design may fail to capture the picture of the gradual fit achievement process that follows a hierarchical time ordering or path. In the cross sectional design, as the data was collected at the same time point, it can only reflect fit or misfit of the picture at this specific point of time, and thus data may be messed up by mixing the hospitals that have already achieved the structure-strategy fit with ones that are still in the early process to gain balance between structure organicity and strategy improvisation. A longitudinal research design, in which data would be collected at two different time points, may be more appropriate in this case. In time one, data would be collected to reflect the early phenomenon of misbalance between structure organicity degree and strategy improvisation level; in time two, collected data would reflect the improved balance after structure adjustment and strategy reorientation over time.

Impacts of institutional environment are indicated by the legitimacy requirements that conservative organizations have conformed to. The health care industry in the U.S. has long been characterized by institutional pressures that are both strong and heterogeneous (Stevens, 1989). Ruef and Scott (1998) identified managerial legitimacy and technical legitimacy as two levels of legitimation efforts within health care organizations. It was expected that clinical IT sophistication should be a result of conformity to the technical legitimacy requirements, and the fit between structure organicity and strategy improvisation should be a result of the institutional pressure to

conform to the managerial legitimacy requirements. Our data analysis showed that a hospital's technical legitimacy was significantly positively related to the clinical IT sophistication at 0.1 level; but we did not find statistical support for the relationship between managerial legitimacy and the fit variable. We believe that the effect of technical legitimacy on clinical IT sophistication effective at 0.1 level could be a small sample bias. A larger sample containing more variations is expected to reveal a significant relationship. Additionally, technical legitimacy focuses on core technology, including normative support for staff qualifications, training programs, work procedures, and quality assurance mechanisms. These assessments specifically revolve around all kinds of patient-focus tasks, such as diagnosis, treatment, education, and continuum of care, as well as ethical standards concerning patient rights (Ruef & Scott, 1998). Clinical IT sophistication may only capture part of the picture, and reflect part of the patient-related tasks. Therefore, it is understandable that a stronger relationship is expected between technical legitimacy and clinical IT sophistication if the measures of clinical IT sophistication also contain, for example, the assessment of functional quality of the clinical technology in addition to the count of technology application. Similarly, managerial legitimacy involves normative support for organizational mechanisms such as personnel management, accounting practices, and rules of conduct and structure of the administrative staff. For hospitals, such legitimacy is typically conferred through oversight bodies (e.g., the American Hospital Association) that review the structure and functions of governance boards and administrator hierarchies. As managerial legitimacy aims to help organizations build up managerial routines that adhere to the normative requirements from the oversight bodies, this process may prefer the policy manual with

clear rules, the highly structured communication channels, and tight formal control of operations by means of a sophisticated control and information system, and put emphasis on holding fast to established management principles, and following laid down procedures. Thus managerial legitimacy may encourage a mechanic structure, and not contribute to the fit between structure and strategy when strategy has to be improvised in the turbulent and non-predictable environment. Therefore, our data reveals important information as to the differential impacts from the institutional environment. On the one hand, technical legitimacy may impose positive effects on the organization and contribute to the organization's technology sophistication. On the other hand, managerial legitimacy helps organizations establish some managerial principles and procedures; these managerial routines may also serve as the obstacle for organization's structural flexibility, and impose negative effects on the organizational change.

It was also expected that the market position of a hospital organization will influence its embeddedness in its institutional context. Our data provided evidence that, for hospitals with conservative mode of adaptation, the hospitals at the core of the field have stronger institutional legitimacy and stronger commitment to prevailing institutions than the hospitals at the periphery of the field. Cliff, Jennings, and Greenwood (2006) extended the "knowledge corridor thesis" (Ardichvili, Cardozo, & Ray, 2003; Samuelsson, 2001; Shane, 2000; Kirtzner, 1997; Venkataraman, 1997) and provided an explanation for this phenomenon: As the peripheral organizations possessed less experience in the field's core, and were newcomers to the way "the game" is typically played, they were thus more likely to act differently and be more innovative and less imitative than core organizations.

Findings for organizations with an entrepreneurial mode of adaptation

Two levels of adaptive activities are assessed for organizations with an entrepreneurial mode of adaptation: one is clinical IT sophistication at the technical level; another is the fit between the structure organicity and strategy improvisation at the managerial level. The entrepreneurial mode of adaptation is illustrated from the environment enactment and legitimization perspectives. Organizations with an entrepreneurial mode of adaptation are actually manipulating and creating their environment. Organizational goals and self-defined strategies are their prime internal motivation for the proactive and exploratory movements.

Our data supported the expectation that entrepreneurial hospitals' clinical IT sophistication turned out to be an effective absorption of organizational slack, and was thus negatively related to the hospital's unabsorbed slack resources. It is understandable that one of preconditions for organizations to advance their technological activities is availability of disposable resources. On the one hand, the unabsorbed resources serve as physical support and facilitators of organizations' strategic behavior; on the other hand, organizations have to legitimize their proactive technical activities by demonstrating that technology sophistication would contribute to resolution of internal pressure such as reduction of sloppy inventory and resource waste, and to effective employment of available resources. This legitimization process is consistent with Galbraith's (1973) argument that slack resources could be an additional cost to the organization and that an excessive level of slack is untenable. Another similarly pessimistic view of slack is from agency theory that managers may use slack to engage in excessive diversification,

empire-building, and on-the-job shirking, and thus become a source of agency problems that breeds inefficiency (Jensen & Meckling, 1976; Leibenstein, 1969).

Our data also showed significant relationship between clinical IT sophistication and regulatory agency ties, but in a direction opposite to our expectation. Our early logic is that hospitals with an entrepreneurial mode of adaptation need to establish numerous ties with regulatory agencies to gain the justification and legitimacy, as regulatory agencies serve as one major external stakeholder for hospital organizations and can affect hospital practice in many ways. However, our findings showed that entrepreneurial hospitals' clinical IT sophistication is significantly negatively related to the number of regulatory agency ties the hospital has. We believe that the findings once again reflect a timing effect of data collection. One possible explanation could be that as entrepreneurial hospitals are characteristic of being proactive and innovative, their technical activities could move far beyond the currently available normalized standard of regulatory agencies. As regulatory agencies need some time to justify the advanced models and update their standards, for a certain period the hospitals' proactive moves on the clinical IT configuration may still conflict with the available norms, and not yet gain acceptance. Therefore, the cross-sectional research design presented a picture that reflected the novelty of entrepreneurial hospitals' adaptive activities at the technical level, and entrepreneurial hospitals' efforts at the early stage in the legitimization process. Particularly, the more nascent the technology configuration, the less ready for the regulatory agencies to prove the acceptance. We expect that an appropriate longitudinal or panel study will help resolve the timing "lag-behind" issue, and reveal the true relationship that entrepreneurial hospitals' clinical IT sophistication has to eventually

gain support and meet legitimacy requirements from regulatory agencies in order to survive for long.

It is surprising that our data did not find statistical support for the impacts of clinical IT sophistication on either technical environment or hospital's technical legitimacy. It was expected that entrepreneurial hospitals would extend their proactive technical activities to the external technical environment, and thus break the existing balance to create chaos and new orderliness accordingly. However, our statistical data showed that entrepreneurial hospitals' clinical IT sophistication was not significantly related to the technical environment turbulence. In this study, technical environment turbulence was indicated as the change rate of technology in the health care industry. The possible reason for no existing relationship between clinical IT sophistication and technical environment turbulence is that hospitals' proactive technical activities may contribute to the emergence and development of new health care products/services in the industry; but the advanced technological activities in the short time may not be sophisticated enough to serve as the dominant technological standard. In this case, instead of immediately driving the established technologies off the market, the novel clinical technology may co-exist with the established ones, and thus not stimulate the turbulence (i.e., the major technology turnover and technological breakthroughs) of the technical environment. Logics from social movement theory (Tilly, 1978) may provide some insights into the findings. According to social movement theory, the process of enhancing the acceptance of new business concepts and modeling the initiatives of collectives that seek to gain ground within the social order is like an admittance-seeking social movement. Rather than attempting immediate major disruption of the industry status quo, the movement

the movement may ascend in some overlapping phases: for instance, first by differentiation and by advocating that the new model could serve as an effective addition or supplement to the existing fields, and address certain important issues not being adequately addressed; and then by legitimacy-building and pressing the claim that breakthroughs and the new standard are possible and acceptable. Therefore, it is understandable that the gradual admittance-seeking social movement may fit the new technological practice into the field invisibly and does not disrupt the environment.

We argued that the process that organizations legitimize their advanced technical activities and their legitimation efforts will result in an increase in technical legitimacy. However, the data did not provide the statistical support. Although the finding is contrary to our proposition, this result is consistent with our statistical finding regarding H7, that an entrepreneurial hospital's clinical IT sophistication is significantly negatively related to the number of regulatory agency ties the hospital has. As at this time the hospital's clinical IT sophistication does not gain support and validation from the regulatory agencies, it is understandable that clinical IT sophistication would thus not contribute to the technical legitimacy. Again, this issue could reflect a timing effect of data collection. In other words, it takes some time for the legitimacy effects of clinical IT sophistication to take effect.

Our data analysis showed that the fit variable between structure organicity and strategy improvisation significantly positively influenced hospitals' human capital, but demonstrated no relationship with managerial legitimacy. Employees act as one important internal stakeholder of organizations. They are the major implementers and adopters of organizations' refined strategies, and their working relationship and

connections are greatly influenced by structure adjustments. It was expected that an integration of matched structure and strategy would contribute to the full utilization of an organization's human resources, and enhance the quality of human capital as a result. On the one hand, the flexible strategy orientation and the organic structure facilitate employees' participation as a result of exposure to a variety of business situations and decentralization of hierarchical power, and contribute to the exploitation of organization's intellectual capital. On the other hand, the exploitation of an organization's human capital is also a process of deepening and augmenting employees' organizational knowledge by extending employees' access to a variety of knowledge domains due to the blurring hierarchical boundary, and by nurturing the learning environment that encourages the new way of thinking and exchanges of ideas. Our findings with organizations' adaptive activities at the managerial level as antecedents, and with improved human capital as outcomes, are consistent with the arguments that implementing managerial functions could be a knowledge management process, embodying the integrated organizational knowledge, and finally contributing to the knowledge creation (e.g., Nonaka , 1994; Nonaka & Takeuchi, 1995).

However, the data did not provide the statistical support that the fit status at the managerial level would be related to organizations' managerial legitimacy. Managerial legitimacy involves normative support for organizational mechanisms. As we mentioned above in analyzing the findings about H4, such legitimacy is typically conferred through oversight bodies (e.g., the American Hospital Association), and may encourage a mechanic management structure. This legitimacy feature apparently conflicts with the managerial fit status of entrepreneurial hospitals that are characteristic of being more

structure-organic and more strategy-improvised. Therefore, the lack of the relationship between the fit variable and managerial legitimacy is understandable. Another explanation is consistent with our analysis about the findings of H9. That is, this issue could reflect a timing effect of data collection. We can expect that, as the fit status between structure organicity and strategy improvisation corresponds with the relevant resolution of organizations' internal pressure that contributes to the full utilization of human resources and quality improvement of human capital, the fit characterized by managerial flexibility will eventually be accepted by the oversight bodies and result in the increase in the managerial legitimacy.

Performance comparison between two types of adaptation

Conservative and entrepreneurial organizations naturally differ in their objectives, dominant strategic orientations, and functional strengths. It was expected that organizations with a conservative mode of adaptation would develop organizational strength in financial performance, and organizations with an entrepreneurial mode of adaptation would develop organizational strength in organizational flexibility. Our data provided the evidence that the financial performance is higher for hospitals with a conservative mode of adaptation than hospitals with an entrepreneurial mode of adaptation; innovation capability is stronger for hospitals with an entrepreneurial mode of adaptation than hospitals with a conservative mode of adaptation. These results are consistent with the findings of a prior study that conservative firms emphasize stability, standardized products, and cost-minimization strategies, and entrepreneurial firms emphasize flexibility, rapid product change, and state-of-the-art product features (Miller & Friesen, 1982; Karagozoglu & Brown, 1988).

Limitations of the Dissertation

This section provides a candid discussion of the limitations of this study. Specific limitations which are addressed include sample choice and sample size concerns, potential measurement issue for some constructs, and the limitations pertaining to the research design.

The sample chosen for this study consisted of general medical and surgical hospitals operating in the Texas area. The potential issue for choosing a sample with similar operating domains and from the same area is the lack of sufficient score variation on classifying dimensions used to unambiguously identify different categories, as these cases tend to present similar features on the dimensions. In our case, the averaged scores on the three classifying dimensions ranged from 2.86 to 5.75 on the 7-point scales with the standard deviation 0.56. Nearly 93% cases scored more than 3.5. Thus the score range did not present sufficient variations. Therefore, instead of using Miller and Friesen's cutoff index as the index does not apply to our study, we divided the score range into three parts with equal percentiles, and used the first percentile and the third percentile to indicate conservative and entrepreneurial hospitals respectively. Two potential issues may thus arise. One is that two categories may not be unambiguous enough to discriminate with each other as their scores did not differ greatly. The other issue is about the sample size concern, as the case number was reduced when the second percentile was deleted. One possible resolution is to adopt a sample from different types of hospitals with discriminant operating domains, such as general medical and surgical hospitals versus specialty hospitals. It is believed that general hospitals are more conservative,

contrasted with specialty hospitals which are more entrepreneurial on the same measurement scale.

While the use of a single type of organization in a single industry and certain geographic area was intended to control for other, confounding changes taking place in the environment, this tactic also decreases the generalizability of the results of this study to other types of organizations, other areas, or to other industries. Therefore, the results based on this sample should be interpreted with caution. Future research can extend this exploratory study by using a national sample and by including more influential factors and assess the external validity of the theory.

Second, this study also contains some small sample size concerns. In this study, while the sample size was sufficient to allow for multivariate testing of main effects, it was insufficient to allow multivariate tests of the interaction effects. Instead, we used the sub-sample method to test the interaction effects, while the interaction term method (moderated multiple regression) may be stricter for testing the moderating effects. Further, the small sample may have resulted in a lack of sufficient power to uncover hypothesized relationships.

Third, although major constructs of the study were measured based on the existing scales, or tailored from established measures to reflect the health care background, given the exploratory nature of the study, some measures have to be developed and employed that had not previously been extensively used and tested in prior literature. Although the results of the study do provide support for convergent and divergent validity between measures, some potential measurement issues include: (a) The measure for the construct technical environment turbulence was adapted from environment uncertainty measures

that particularly captured the features of one sector of the environment: technical environment. In our study, as the multi-item measures presented some reliability issues for the construct, one single item had to be adopted that reflected the change rate and magnitude of technology development in the environment particularly. As the reliability and validity quality is difficult to estimate for the single-item measure, this measure does present some measurement flaws. (b) Another potential measurement limitation is the common method variance bias, since part of the data relies on respondents' interpretation and personal evaluation of survey questions. In this study, some self-report measures were used to assess constructs such as the organization's competence, innovation capability, structure-organicity, etc. As upper-level administrators may have avoided revealing any information that, in their opinion, might have been damaging to the organization's image and competitive position, and as an organization's informants may be biased judges of their own organizational performance, these measurements may contain the flaw of social desirability. Therefore, incorporating more objective measures from additional sources may alleviate the potential problems. On the other hand, we have reason to believe that the threat of common method bias was minimized in this study, as we also refer to archival data such as revenues and facility numbers to double check on the relevant responses. Additionally, it is believed that common method variance tends to be problematic only when a respondent is sensitive about a question (Boyd & Fulk, 1996). In this study, questions regarding structure adjustments, strategic orientations, etc., are relatively objective and not likely to evoke sentiments (Steensma, Marino, Weaver, & Dickson, 2000). (c) As technical legitimacy and managerial legitimacy are two constructs that are relatively new in management research and hospital literature, we used

memberships and approval codes from the American Hospital Guide as the corresponding objective indicators. However, some researchers have demonstrated their concerns with high standards as to the quality of data and the accuracy and validity of measurement, as well as a good deal of methodological self-consciousness in using the AHA guide as the data source (e.g., Alford, 1974). Some problems have been identified concerning ambiguities in the data and in the basic concepts which appear when empirical specification is attempted. Therefore, results concerning these constructs should be interpreted with caution.

In general, while none of these measurement limitations represents a fatal flaw, future studies should work to address as many of these concerns as possible. Further, alternate operationalizations of above mentioned variables should be developed that would adequately represent the constructs under consideration.

One more potential limitation of the study concerns the research design. In this study, we adopted the cross-sectional research design, and assumed that for a given period of time, the relationship with the direction from environmental sectors to organization will be much stronger for organizations with a conservative mode of adaptation, and the relationship with the direction from organizational activities to environment will be much stronger for organizations with an entrepreneurial mode of adaptation. However, as we mentioned in the section on study findings, the cross-sectional research design has the disadvantage of restricting measurement to a single point in time, and of being incapable of capturing the dynamic picture of the relationships under consideration. This type of research design may also be subject to the timing effect and thus lack sufficient power to uncover hypothesized relationships. Especially for the

hypotheses concerning the legitimization process and fit achievement process, a longitudinal or panel study that controls for the time effects may be more appropriate to assess the proposed relationship.

Implications for Practice

By examining the interactive relationships between the environmental and organizational factors, and by exploring the distinct features of the adaptive activities at different functional levels for organizations with either a conservative mode of adaptation or an entrepreneurial mode of adaptation, this dissertation provides several actionable implications for organizations with distinct strategic postures.

The results of the study indicate that organizations with a conservative mode of adaptation and those with an entrepreneurial mode of adaptation manifest quite different characteristics in coping with their environments. This might be true of the drift towards excessive conservatism or excessive entrepreneurialism. Practitioners should begin to focus upon both dangers. Hospitals with a conservative mode of adaptation tend to comply with the change of environmental conditions only to the extent that the organization's competence is threatened. This pattern of adaptation, which can be characterized as an act of almost forced compliance, may cause maladaptive behavior and costly repercussions, and lead ultimately to a major crisis. To reconcile these costly tendencies, hospital administrators may consider developing a top management team with a flexible orientation, maintaining slack resources, instituting adequate innovative capabilities, and adopting specialized environmental analysis units that not only sense pertinent intelligence but also actually act on it. In contrast, the results of the study indicated that hospitals with an entrepreneurial mode of adaptation, independent of the

environmental conditions, are more likely to solely emphasize flexibility. This practice implies that such organizations may persistently seek to innovate, and may gain momentum and innovate to a dysfunctional extent, thus hurting their financial performance. That is consistent with our findings that hospitals with an entrepreneurial mode of adaptation tend to excel in their innovation capability, but present weaknesses in their financial performance evaluation. These findings are consistent with Hambrick's (1983) work which revealed that in innovative as well as noninnovative industries, entrepreneurial organizations are outperformed by conservative organizations with respect to current profitability and cash flow. The implication of these findings is that managers of such hospitals with entrepreneurial posture should recognize the importance of alternating between the objectives of flexibility and efficiency. Further, to avoid momentum and overextension of resources, managers should adopt effective control systems. Thus, in line with the suggestion of Maidique and Hayes (1984), we can conclude that the continued success of entrepreneurial organizations depends on their ability to manage alternate periods of innovation with periods of continuity and consolidation.

While this study starts by examining common organizational types before making predictions about behavior and performance, this does not mean that a change agent will not work with certain types of organizations. Actually, our findings provide evidence that different organizations do require very different kinds of forces to stimulate change and balance against the force of momentum. Specifically, for organizations with a conservative mode of adaptation to stimulate entrepreneurship, the focus may have to be upon the top management, and the change may best be stimulated by explicit product-

market strategies which ritualize and systematize entrepreneurship, and minimize the disruptiveness of entrepreneurship, in addition to the routine internal operating matters that function mechanically. If the leader of such organizations has the wrong personality (for example, over-confidence and erroneous perception of organizational competence) or inadequate power (for example, leading an organization at the core of the field, with new practices greatly limited by the routines normalized in the organization), change for the entrepreneurship for such organizations will be rare. For organizations with an entrepreneurial mode of adaptation to avoid being dysfunctionally proactive, as indicated in our study results, successful entrepreneurial activities should meet with the environment's legitimacy requirement (e.g., establish ties with regulatory agencies), and contribute to the absorption of organizational slack and improved quality of the organization's human resources. As such, organizations with an entrepreneurial mode of adaptation should maintain their entrepreneurship according to the demands of their environments and their organizational capabilities. Any change agent wishing to stimulate change and correct momentum dysfunction would probably be wise to focus upon these distinctions.

Directions for Future Research

Organizations evolve consistently in accordance with a perspective, strategy, ideology, and mission of their own; concepts that are manifested by an integral alignment or gestalt among environmental, organizational, and strategic variables. To reverse the trend of adaptation and abandon this orientation in the face of every problem would be exceedingly costly and would result in many discrepancies and imbalances.

Organizational adaptation can present as sluggish responsiveness to the crisis, or can be proactive as well, depending on the organization's strategic posture and business logic.

At this stage it is important to interject a note of caution in interpreting the study findings. The focus has been on significant general tendencies, not conditions that hold for all historical sequences. Together, sequences of pervasive revolution and pervasive momentum account for only a part of the sample; obviously there are incremental and piecemeal sequences of reversals and momentum. The only contention here is that the findings represent significant tendencies in the sample, not that they exhaust all of the possibilities.

We encourage other researchers to look more closely at corporate histories to gain further insights into the dynamics of organizational adaptation. Future research should attempt to overcome the above mentioned limitations and extend the scope of this study. As illustrated in the limitations section, broader samples, more concrete variables, and a concentration on longer time periods or refined time series data might all add significantly to the findings. A study of the process of adaptation as it evolves over time can bring much more understanding about the pitfalls and challenges facing strategists and designers of organizations. Particularly, we elaborate on the following points.

Changes in organization structure, strategy, and technological process leave an organization "stronger" or "weaker" in terms of adaptive capability to deal with subsequent external forces or changes in the environment. As the change can be continuous and dynamic over time, a more suitable research design can involve a time dimension with hierarchical time orderings, or time paths of the adaptive responses included in a dynamic ongoing process (involving the institutional, managerial, and

technical levels). For example, the framework can be extended by specifying which functional activities (technology, strategy, or structure) will be first impacted and prompted to adapt under varying degrees of organizational and environmental constraints, and which adaptive activities will follow over time. This hierarchical time path perspective is reasonable since adaptation entails costs, and organizations attempt to limit these costs whenever possible. In other words, the alternations an organization makes require shifting some established behavioral patterns, and as a result, costs may arise associated with implementation, loss of autonomy, increased dependency, and increased uncertainty (Cook, Shortell, Conrad, & Morrisey, 1983). Consequently, the adaptation choices organizations make may follow a hierarchical pattern based on the relative costliness of the resulting organizational changes. This incremental perspective is also consistent with previous theories that emphasize a sequence of realignment responses (e.g., Aldrich, 1979; Weick, 1976). Previous theories have not clarified, however, whether organizations initiate a sequence of adaptation activities ranging from the least to most costly in response to variation in certain environmental sectors but initiate a direct, more costly, response to accommodate variation in other sectors. As the value of selecting adaptation responses that are no more costly than necessary is obvious and critical for any organization; and judicious adjustments that minimize the costliness of realignment are imperative, it is necessary to further examine the hierarchical time path pattern of sets of adaptation responses with cost consideration.

Another meaningful extension of the study is to address a third possibility of adaptive organization: ambidextrous organizations. Although organizations with either a conservative mode of adaptation or an entrepreneurial mode of adaptation have indeed

been the major players in shaping the organizational adaptation landscape, a small minority of firms excel in both respects, and are called ambidextrous organizations (O'Reilly & Tushman, 2004). An ambidextrous organization is capable of exploring new opportunities and pioneering radically new products and services, as well as exploiting existing capabilities and refining current offerings (O'Reilly, & Tushman, 2004). Such an organization embodies both characteristics of organizations with a conservative mode of adaptation and organizations with an entrepreneurial mode of adaptation, in that such an organization can develop radical changes consistently and protect their traditional business by incremental realignment at the same time. The existence of such firms neither negates the occurrence of either adaptation mode nor invalidates the more general drivers and implications of either adaptation mode. Rather, these exceptions provide an opportunity for further research. A detailed discussion of endogenous (e.g., leadership style, organizational structure, systems) and exogenous (e.g., structural characteristics of the industries) factors underlying the superior performance of ambidextrous organizations is beyond the scope of this article. However, we recognize its importance in the broader context of enhancing the understanding of the linkages among environment, strategy, competitive advantage, and firm performance. For example, ambidexterity as a desirable organizational trait has typically been associated with the structural separation of activities (Birkinshaw & Gibson, 2004). A complementary way of thinking about ambidexterity has it emerging through a firm's organizational context as well as through its structure. As such, a promising line of research can propose that a supportive organizational context – characterized by a combination of performance management and social support – would be associated with a higher level of ambidexterity. Furthermore,

additional analysis and refinements can be pursued by the authors that address the value dynamics underlying ambidextrous organizations. Specifically, how does organizational ambidexterity influence organizational performance and maintain sustainability of superior value creation by pursuing and enacting resource allocation synergies, and by shifting resources flexibly across different parts of the activities over a long timeframe, as well as how does the organizational ambidexterity possibly mediate between organizational context and performance.

Overall, the major theoretical contribution of the study is that it provides a holistic view of the interplay between context, adaptability, and outcome perspectives in strategic management. A series of future studies that tackle the above-mentioned issues will contribute significantly to our understanding of organizational adaptation. We view this study as a first step in these lines of inquiry.

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APPENDIX A
COVER LETTER AND MAIL SURVEY

September 30, 2007

«AddressBlock»

«GreetingLine»

As a hospital administrator, your leadership helps shape the picture of hospital practice. We need your assistance to help us conduct a research program to gain a better understanding of the interactive relationship between the hospital organization and the external technical and institutional environments, as well as the organization's adaptability.

This research is set to understand the dynamics of hospitals' adaptive activities, and provide insights on the emerging composition of the industry, as well as its impacts on the cost and quality of the hospitals' products and services. Your experience in directing a hospital means you have an important perspective on these issues. We would greatly appreciate it if you could take the time to answer a 2-page questionnaire and return it in the postage paid envelope. Your responses will be held in strict confidentiality as your responses will be aggregated with others.

Should you have any questions, or if you would like to receive a copy of the results of this study, please feel free to contact us by phone at (205) 348-6421 or by email at qxiao@cba.ua.edu.

Again, your participation is crucial to the success of our efforts. We appreciate your devoting time to this request, and thanks in advance for your time and generous assistance.

Sincerely,

Qian (Jane) Xiao

A: To what extent do you agree or disagree with the following statements describing the external environment of your organization?

Strongly Disagree	Disagree	Moderately Disagree	Neither Agree Nor Disagree	Moderately Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

_____ The technology in our industry is changing quite rapidly.

B: To what extent do you agree or disagree with the following statements describing your organization's activities in terms of the strategy process, innovation, and other activities in your organization?

Strongly Disagree	Disagree	Moderately Disagree	Neither Agree Nor Disagree	Moderately Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

- _____ 1. Improve a lot in implementing the strategic plan
- _____ 2. "ad-lib" our strategy programs as we execute them
- _____ 3. We rely principally on experience-based intuition when making operating and strategic decisions.
- _____ 4. Technical innovation, based on research results, is readily accepted.
- _____ 5. Management actively seeks innovative ideas.
- _____ 6. In making strategic decisions, we constantly seek to introduce new health care services or products in the market.
- _____ 7. There have been significant changes in existing health care product lines / service offerings in the past ten years.
- _____ 8. Whenever there is ambiguity in government regulation or market structure, we will move proactively to try to take a lead.
- _____ 9. In making strategic decisions, we respond to signals of opportunities quickly.
- _____ 10. There is an ongoing, active search for new opportunities.
- _____ 11. In making strategic decisions, we tend to focus on investments that have high risk/high returns.
- _____ 12. We search for big opportunities, and favor large, bold decisions despite the uncertainty of their outcomes.

C: In reference to each set of descriptions below about organizational structure, determine how closely your organization falls to either extreme by circling the appropriate number along 1 to 7 scale, using your best judgment.

1. Highly structured channels of communication and highly restricted access to important financial & operating information.	1	2	3	4	5	6	7	Open channels of communication with important financial & operating information flowing quite freely throughout the organization.
2. A strong emphasis on holding fast to established management principles or the formally laid down procedures despite any changes in business conditions	1	2	3	4	5	6	7	A strong emphasis on adapting freely to changing circumstances without too much concern for past practices.
3. Jobs are clearly distinct and duties should not cross	1	2	3	4	5	6	7	Jobs are not clearly distinct and may be performed by many departments

departmental lines								
4. Decision authority based on managerial positions	1	2	3	4	5	6	7	Decision authority based on expertise

D: To what extent do you agree or disagree with the following statements that describe your organization's human capital and the nature of other organizational resource?

Strongly Disagree	Disagree	Moderately Disagree	Neither Agree Nor Disagree	Moderately Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. Our clinical staff and physicians are highly skilled.

2. Our clinical staff and physicians are creative and bright.

3. Our clinical staff and physicians are experts in their particular jobs and functions.

4. The organization's retained earnings have been sufficient for market / capacity expansion.

5. The organization has a pool of financial resources that can be used on a discretionary basis.

6. The organization is able to secure necessary bank loans or bonds.

E. Information Technology: Please check (✓) which of the following processes or activities are computerized.

Patient Management

- Inpatient pre-admission Bed availability estimation Inpatient admissions
 Inpatient discharges Outpatient admissions Inpatient transfers
 Waiting list management Patient-Index Other(s): _____

Patient Care Activities -- Physician

- Operative reports Discharge summary Order entry / Results reporting
 Face sheet (abstracts) Other(s): _____

Patient Care Activities -- Nursing

- Staff scheduling Vital signs recording (from monitoring equipment)
 Medication administration Staff workload management
 Physician orders transcription Care planning Nursing flowsheet
 Historical record keeping Patient acuity/condition recording Quality assurance
 Other(s): _____

Patient Care Activities -- Emergency Room

- Physicians' orders transcription Patient data collection (consultations, tests, etc.)
 Registrations and admissions Order entry / Results reception
 Patient inflow, waiting time, crowding Staff scheduling Other(s): _____

Patient Care Activities -- Operation Room

- Case costing Anesthetic notes recording
 Materials (tools) management Operations' booking
 Staff scheduling Other(s): _____

Clinical Support Activities -- Laboratories

- Patients registration and admission Specimen archiving Staff workload management

- Blood bank management Specimen pick-up rounds scheduling
 Recurring tests management Results validation (abnormalities, etc.)
 Results capturing from analyzers with QA capabilities Other(s): _____

Clinical Support Activities -- Radiology

- Patients registration and admission Label generation (for envelopes)
 Staff workload manage Results capturing (from X rays, CT, Ultrasound, etc.)
 Other(s): _____

Clinical Support Activities -- Pharmacy

- Medication purchasing Duplicate orders checking Medication administration
 Wards stock management Patient drug profile lookup Making out refill reports
 IV admixtures management Drug interaction checking
 Historical information storing Other(s): _____

F: Please indicate the extent to which your organization's top managers are currently satisfied with the performance on each of the following criteria. Please use the following scale.

Very Unsatisfied	Unsatisfied	Moderately Unsatisfied	Neither Satisfied nor Unsatisfied	Moderately Satisfied	Satisfied	Very Satisfied
1	2	3	4	5	6	7

END OF SURVEY – THANK YOU FOR YOUR COOPERATION AND TIME IN COMPLETING THIS SURVEY!