

ABSTRACT

A Theory of Information Systems Strategy: Antecedents and Performance Impacts through the Development of Dynamic Capabilities

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Of central importance to the functioning of the IT department is its information systems (IS) strategy which delineates the perspective it takes toward IS and the general attitudes that reflect intentions regarding IS. While research attention has been copiously given to the arena relating to the strategic value of IS, much of it focuses on strategic IS planning, strategic alignment, and IS for competitive advantage. Fewer studies have assessed the impact of the IS strategy itself, which can be an important avenue through which firm performance may be realized. As such, we propose and test a theory of IS strategy that seeks to link IS strategy to IS's contribution to firm performance. Drawing upon two major perspectives—the power and politics perspective and dynamic capabilities perspective—to formulate the research, we offer a model that includes antecedents and expected impacts of IS strategy. Responses from 271 CIOs were collected via an online-based survey to test the proposed model. Results suggest that the culture and power of the IT department are significantly associated with the type of IS strategy implemented. When departmental members are highly involved in the affairs of the department, the strategy is more likely to be defined, but not necessarily innovative;

rather, a culture where creativity and risk taking abound is one in which innovative strategies seem to thrive. Further, departments with greater resource support and CIO expertise tend to implement more innovative strategies. Results also provide insights into the impacts of IS strategy. While innovative strategies reinforce dynamic capabilities development, undefined strategies tend to prove detrimental to capabilities development, and conservative strategies tend to neither help nor hurt capabilities development. The impact of strategy on performance is mediated through dynamic capabilities, with the IS Innovator leading in way of performance, followed by the IS Conservative, and lastly the IS Undefined, whose lack of strategy is harmful. Post-hoc analysis revealed a fourth possible IS strategy, one that strives for ambidexterity. Ambidextrous firms were associated with the most superior performance, leading to a potential extension of the existing IS strategy typology and a call for future research.

A Theory of Information Systems Strategy: Antecedents and Performance Impacts
through the Development of Dynamic Capabilities

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CHAPTER ONE

Introduction

Information systems (IS) are an important buttress for success in many organizations today. A recent Gartner survey of CEOs and other senior business executives found that 62 percent of the executives viewed information technology (IT) as a critical factor in their post-recession strategy (Heath 2009). Not only do these senior executives plan to use IT to cut costs, but they also plan to use IT systems as a way to drive revenue growth for their firms and most IT departments are ready for fresh investments after receiving relatively low levels of funding during recent years (Heath 2009). Recent interviews with Chief Information Officers (CIOs—leaders of IT departments) of major corporations such as Boeing, Coca-Cola, Intuit, and Lockheed Martin, indicated agreement among them that the future of both national and corporate competitiveness depends on firms' ability to innovate, and that this ability to innovate is tied intensely to new technologies (Bergstrand 2011). As Gregg Garrett, Chief Strategy Officer for IT and Innovation at the Volkswagen Group of America, suggested: CIOs should no longer be called Chief *Information* Officers, but should rather be Chief *Innovation* Officers of information technologies (Garrett 2011). Since the future of business depends on the internal and external connections that these new information technologies enable, the organization's IT department may be better equipped than other business units to execute the necessary changes for the technology-driven economy in the coming decades (Lundberg 2006). As such, the functioning of the IT department can render significant contributions to a firm's overall performance.

Of central importance to the functioning of the IT department is the organization's IS strategy which delineates the perspective the organization takes toward IS and the general attitudes that reflect the organization's intentions regarding IS (Chen, Mocker, Preston, and Teubner 2010). As business strategy is vital to the success of an organization, so IS strategy should be imperative to the success of the IT unit and IS's contribution to the organization's overall objectives. An IS strategy is believed to be a valuable source of stability for many IT departments (Mahoney 2009) because it provides a focused strategic direction for the department notwithstanding the present state of the economic cycle (Aron 2009). A well-defined strategy can also help stakeholders, such as employees, focus their attention and behaviors in order to make the right decisions in support of the organization's desired strategic directions and can boost employee morale by maintaining employees' focus on organizational goals, especially during unstable economic times when more pressure and uncertainty are present (Aron 2009). Consistently executing to a well-defined IS strategy can also help avoid damaging organizational and departmental capabilities that are critical in areas where IT enables the organization to differentiate itself in its market (Aron 2009).

Yet despite the significance implications of IS strategies, the concept of an IS strategy is taken to mean different things to different people, as can be inferred from the diverse conceptions of IS strategy found in the literature (Chen et al. 2010). This fragmentation of our understanding of IS strategy can render negative consequences in our knowledge building in this domain because of the difficulty in comparing and interpreting findings across studies. In addition, while research attention has been copiously given to the arena relating to the strategic value of IS, much of it focuses on

three streams of literature: strategic information systems planning (SISP) (Das, Zahra, and Warketin 1991; Galliers 1991; Premkumar and King 1994; Teubner 2007), strategic alignment (Chan et al. 1997; Chan and Reich 2007; Henderson and Venkatraman 1999; Luftman and Kempaiah 2007; Preston and Karahanna 2009), and IS for competitive advantage (Mata, Fuerst, and Barney 1995; Melville, Kraemer, and Gurbaxani 2004; Wade and Hulland 2004). Fewer studies have assessed the impact of the IS strategy itself, which can be an important avenue through which performance may be realized. Therefore, this study uses a recently reconceptualized typology of IS strategy that unifies prior conceptions and aims to fill some of the research gap in the literature as it relates to IS strategy and its antecedents and impacts.

In this dissertation, we propose a theory of IS strategy that seeks to link IS strategy to IS's contribution to the firm's performance. This theory is intended to offer explanation and prediction for IS strategy, a type IV theory in Gregor's (2006) classification of theory types, which will be further discussed in Chapter Three. Drawing upon two major perspectives or literature streams to formulate the research, we offer a model that includes the antecedents and expected impacts of IS strategy. The power and politics perspective is used to identify the antecedents while the dynamic capabilities perspective helps formulate the anticipated performance impacts of IS strategy. However, strategy itself may not necessarily directly lead to performance gains. Alternatively, we contend that it is the IT business unit's consistent enactment of the IS strategy that aids the development of certain dynamic capabilities for the business unit, which in turn create gains in efficiency and effectiveness that contribute to the

organization's overall performance. This dissertation will construct and empirically test a model of IS strategy using a survey-based study.

However, as part of our involvement in a separate, but subject-related study, we are in the process of interviewing the CIOs of major organizations. Approximately 25 interviews have been completed as of the time of this writing and we believe that these interviews can add value to this dissertation by illustratively informing the dissertation with first-hand examples. As such, we will integrate, where appropriate, findings from the interviews to exemplify the discussion herein. These interviews will be for illustration purposes only and are not part of the formal methodology of the current study. To protect anonymity, the names of companies and interviewee participants will not be identified.

This dissertation proceeds as follows. The next chapter summarizes the background literature related to IS strategy while Chapter Three justifies and develops the proposed research model. Chapter Four describes the method for conducting the study and provides the definitions and measures for each construct used. Chapter Five details the analysis and results of the data collected. Chapter Six includes a detailed discussion of the results found, provides implications for both research and practice, and describes the limitations of the study. And finally, Chapter Seven offers a summary and conclusion.

CHAPTER TWO

Background Literature

In this chapter, we review the literature on the two concepts most central to the dissertation. First and foremost is the concept of IS strategy. Although the term ‘IS strategy’ is commonly used, it is not well understood (Chen, Mocker, Preston, and Teubner 2010). Recognizing the important impact an IS strategy has on the potential value IS brings to an organization’s long-term performance and the need to better understand the concept of IS strategy, Mocker (2007) and Chen et al. (2010) conducted an extensive review of the literature with the goals of providing a definition of and delivering a typology that operationalizes IS strategy in a way that can be applied to an organization holistically. In our study of IS strategy, we choose to adopt Chen et al.’s (2010) typology of IS strategy for several reasons. First, it was developed after an extensive literature review and was published in a high impact journal—*MIS Quarterly*. This is a good indication that the typology has been meticulously scrutinized by knowledgeable researchers in the field. Second, it is the most recent conceptualization of IS strategy that takes into account a broad array of past research literature. And third, the typology does not reflect general business strategy, but is specific to the IS context.

The second concept central to the theory proposed in the dissertation is dynamic capabilities. Although an organization may have a well-defined IS strategy, a strategy alone may not guarantee superior organizational performance. Rather, according to the dynamic capabilities perspective, which will be reviewed later in this chapter, firms demonstrating the ability to provide flexible product innovations and timely responses in

dynamic business environments will be the ones able to achieve competitive advantage in such settings (Teece, Pisano, and Shuen 1997). We argue, in essence, that dynamic capabilities will mediate the impact of IS strategy on performance outcomes and therefore review the literature on dynamic capabilities, particularly on absorptive capacity and agility, which are identified as most relevant to this study.

This chapter is structured as follows. The chapter first presents the definition of IS strategy and the three conceptions of IS strategy that were found in the literature. It next summarizes the typology of IS strategy and provides the original measurement items. It then offers our own critique of the IS strategy conception and typology. And it finally provides a review of the dynamic capabilities absorptive capacity and agility, which are also central to the theory to be proposed herein.

Definition and Three Conceptions of IS Strategy

The ill-defined use of the term *strategy* has brought about confusion in the management field (Mintzberg 1987). Mintzberg (1987), in an attempt to clarify the concept of strategy, offered five definitions of strategy, which have become the well-known *five Ps* for strategy. He defined strategy as (1) a plan—an intended course of action, (2) a ploy—a specific maneuver to outwit a competitor, (3) a pattern—a stream of realized ploys, (4) a position—a means of matching an organization with its external environment to find the right market niche, and (5) *a perspective*—a shared view of the organization that is ingrained among its members. This fifth definition of strategy reflects the organization's norms and values and how codes of behavior become rooted in organizational members (Mintzberg 1987). While these definitions compete, according to Mintzberg, they also complement each other in that each P adds an important element

to understanding strategy and helps address essential questions about organizations in general. The fifth definition, in particular, has the most potential to draw researchers closer to the most fundamental issues about organizations as instruments for collective action and to overcome the existing dilemmas in strategy research, among which is the clash between defining strategy *ex post* as actions and outcomes that have been realized and defining strategy as actions that are formally written and intended (Mintzberg 1987).

A review of the articles that specifically study IS strategy suggests that the concept of IS strategy has been inconsistently defined and measured. Few that we have come across actually provide a definition of IS strategy. However, the definitions implicitly employed in the articles can be categorized into three conceptions of IS strategy (Chen et al. 2010; Mocker 2007). The *first conception* is that IS strategy is the use of IS to support the business strategy. This conception answers the question: in what way can IS help the business gain and sustain a competitive advantage? It suggests that an IS strategy must be linked to an existing business strategy, which Mintzberg (1987) calls the fourth P, the position. For example, a firm that follows a market development strategy (Ansoff 1965) would embrace an IS strategy that involves IS resources deemed to support market development activities. One definition falling into the first conception that has been previously provided in the literature points to an IS strategic plan as “a portfolio of computer-based applications that will assist an organization in executing its business plans and realizing its business goals” (Lederer and Salmela 1996, p. 238). Another definition proposes that IS strategy is “a complex of implicit or explicit visions, goals, guidelines and plans...sanctioned by management, intended to support the objectives of the organization on the long run” (Smits, van der Poel, and Ribbers 1997, p.

131). This dependence or alignment between the firm's business strategy and IS strategy can be seen in academic research by Chan, Huff, Barclay, and Copeland (1997), Duhan, Levy, and Powell (2001), Luftman and colleagues (Luftman 2003; Luftman, Papp, and Brier 1999), and Kearns and Sabherwal (2006-7), for instance, where it is more or less assumed that the purpose of IS strategy is to support the firm's business strategy. Research by the Gartner Group also attests to this conception. Gartner suggests that the IS strategy "helps guide the business strategy based on IT capabilities and opportunities, and determines IT's contribution to delivering on the business strategy" (Aron 2011, p. 1) and IS strategy "provides the vision for how the IT organization will deliver on the business promise to its stakeholders" (Colella 2009, p. 3).

This conception of IS strategy may prove advantageous in terms of IS's contribution to the organization's overall performance. To illustrate, typically, when members of a team work together toward a shared goal, the team produces a result that is greater than the resulting sum of individual members working alone. In a similar sense, when all divisions work together to support the organization's objectives, the resulting contribution to the organization's performance will be greater than the resulting sum of each division working towards its own purpose. This alignment of IS strategy to the firm's business strategy should then build a stronger, less fragmented firm. Conversely, one disadvantage of this conception of IS strategy is that the IS strategy must depend on the existence of a defined business strategy. Not only is this so, but the quality of the IS strategy is also contingent upon the quality of the business strategy. And it cannot be assumed that all organizations have a defined business strategy, much less one of high quality. An example of such a case arose during our CIO interviews. The CIO of a

mortgage lending firm whom we interviewed suggested that not only did she need to create an IS strategy when she was hired, but was put in charge of driving the strategic planning for the entire company because the company did not have a well-defined strategy at that point. So in order to create a strategy for IS, she first needed to create a strategy for the company. This case illustrates the weakness of conception one, where the IS strategy relies on the business strategy.

The *second conception* suggests that IS strategy is the master plan of the IS function. This conception focuses on the strategy to run the IS function efficiently and effectively by identifying the assets, personnel, structures, monetary resources, and technologies that are required to implement the strategy. It is Mintzberg's first P—the plan—of the IS function. Unlike the first conception, the second conception does not require that IS strategy be developed from the business strategy, but rather in isolation and thus independent of the business strategy. Some researchers using this conception of IS strategy regard the strategy as the 'business strategy' of the IS functional unit (e.g. Adler, McDonald, and MacDonald 1992; Ragu-Nathan, Ragu-Nathan, Tu, and Shi 2001; Tai and Phelps 2000) because the IS function is described as itself a business, that is, a "business within a business" (Cash, McFarlan, McKenney, and Applegate 1992, p. 3) and an "organization within an organization" (Ahituv and Neumann 1990). One definition falling into the second conception proposes that IS strategy "deals with management of the entire information systems function" (Ragu-Nathan et al. 2001, p. 269). The IS function "is in the business of providing its services to users within the organization who, therefore, may be regarded as its customers" and the IS unit is also "in competition with these same customers for allocation of significant levels of organizational resources"

(Ragu-Nathan et al. 2001, p. 277). Hence, the second conception of IS strategy suggests that the IS strategy is independent and potentially distinct from the firm's overall business strategy.

The advantages and disadvantages of the second conception are the inverse of those for the first conception. While the IS strategy can be developed independently and regardless of the existence of a well-defined business strategy, IS would be less able to contribute to the overall mission of the organization if its strategy was misalignment to the organization's business strategy.

The *third conception* suggests that IS strategy is the shared view of the role of IS within the organization. This conception appears to us to be the most implicit and difficult to identify in the literature and there is much overlap among articles using both the second conception and this conception. The third conception is a higher level conception that views IS strategy as an organizational perspective—Mintzberg's fifth P. In contrast to the first two conceptions where IS strategy is a plan or position, the third conception views IS strategy as a guide for future IS-related decisions and actions and is reflective of the top management's attitudes regarding IS (Chen et al. 2010; Mocker 2007). This shared view among top management ensures that all organizational members are headed in the same direction (Tai and Phelps 2000), which leads to general consensus among members regarding IS's role in relation to the rest of the organization (Pyburn 1983). But the three conceptions of IS strategy are not necessarily mutually exclusive. We believe that the third conception of IS strategy as a shared perspective can encompass the first conception of IS strategy as the use of IS to support the business strategy and the second conception of IS strategy as the master plan of the IS function. Management can

share the view that the purpose of IS strategy is to support the business strategy while simultaneously hold the view that the IS strategy is the master plan of the IS function. In this case, the master plan for IS would be in line with the business strategy and the three conceptions would thus overlap.

Of the three conceptions, the third conception is the one most in line with Mintzberg's fifth definition of IS strategy suggesting that strategy is a 'perspective'. Since, as we had earlier suggested, the third conception can sometimes encompass the first two conceptions, we believe it offers an overarching view of IS strategy and has the most potential for consolidating the research on IS strategy. Adopting the definition of strategy as a perspective, Chen et al. (2010) define IS strategy as "the organizational perspective on the investment in, deployment, use, and management of information systems" (p. 237). Defining IS strategy as a perspective does not imply that IS strategy is necessarily a realized outcome or that it is a set of formally planned or intended actions. Although we believe that it is useful for organizations to have formally stated IS strategies so that all members understand the approach the organization intends to take toward achieving its goals, sometimes these approaches are not formally articulated (e.g. Slater 2002). Even though organizations may not have formal, written IS strategies, they still use IS and make decisions regarding IS. The above definition, based on the third conception of IS strategy, reflects the belief that is shared among the upper echelon of the organization on how IS should be invested in, deployed, used, and managed. However, based on the context of our study, a combination of the three conceptions are applicable to this study since the third conception can encompass the first two and the second conception of IS strategy is defined at the IT unit level, which is our target level of

analysis. We adapt the above definition for the study of IS strategy at the current level of analysis, i.e. the IT department level, and specifically define IS strategy as *the organization's perspective on how to invest in, deploy, use, and manage information systems as represented at the IT department level.*

IS Strategy Typology

Following the definition of IS strategy as a shared organizational perspective on information systems, Chen et al. (2010) developed a typology and operationalization of IS strategy. They categorized IS strategy into three types—two of which are defined IS strategies (the IS Innovator and the IS Conservative) and one of which is an undefined strategy (the IS Undefined). An *IS Innovator* strategy is defined as an organizational view that continuously aspires to be innovative through new IS initiatives, i.e. this strategy seeks to *explore* new, uncertain alternatives. The goal of the IS Innovator is to be an IS leader in its industry by striving to be the first to respond to opportunities in which it can capitalize on IS innovations that will create value for the business. Since IS strategy is defined as a perspective rather than a few distinct actions or decisions that a firm makes, the IS Innovator will not always be the first to adopt each new IS innovation nor will it always be on the leading edge of every area of technology. It is, rather, defined by the consistency in its strategic perspective to aspire to constantly search for ways to innovate with IS and to apply those innovations in ways that give the firm an advantage over its competitors. An example of the IS Innovator approach can be illustrated using our interview with the CIO of a certain department store chain. The CIO suggested that his organization is implementing a system where sales associates would be able to take pictures of clothing outfits and matching accessories in the store and

instantaneously send them to customers requesting them. They wish to implement, perhaps for regular customers, a system that allows the customers to view pictures of themselves in the outfits before making a purchase. Another example of the IS Innovator can be illustrated using Amazon.com. In 2000, Amazon launched its electronic book (e-book) store, featuring content that had never before been released in print and titles no longer in print (Amazon News Release 2000). While the technology may not have been new, the use of the IT to deliver a service that provided consumers instant access to purchase and download e-books was novel at the time. Furthermore, Amazon announced that it will launch in late 2011 a lending library for its Kindle devices that provides consumers access to lend e-books from over 11,000 public and educational libraries across the U.S. (Amazon News Release 2011). Consumers will be able to check out e-books from local libraries and start reading on their Kindle devices or applications. Amazon's approach capitalizes on the e-book market which should create a competitive advantage for its Kindle devices, and as such, Amazon is an example of an IS Innovator in its industry.

An *IS Conservative* strategy, on the other hand, represents an organizational perspective that strives to create value by gaining efficiency through effectively refining and improving existing IS practices and technologies, i.e. this strategy seeks to *exploit* existing organizational resources. Unlike the IS Innovator, the goal of the IS Conservative is not to establish itself as an IS leader by developing or adopting new IS initiatives. Instead, it seeks a more stable approach to IS by exploiting IS innovations only after they have been carefully evaluated and tested by other firms in the industry. This strategy allows the IS Conservative to avoid the risks involved in being early

adopters of IS innovations. Although it is conceivable, under certain circumstances, that an IS Conservative is the first to adopt a new technology or process, being a first adopter is not generally the approach of an IS Conservative. Rather, the IS Conservative's overall perspective is to follow a conservative stance to exploiting IS for its strategic business purposes. The conservative IS approach tends to be the default approach in many organizations. One of the reasons for the prevalence of this approach is government regulations, which can stifle, to a certain extent, the level of innovation that the IT department can seek to implement. In our CIO interviews, the majority of the CIOs in the healthcare and energy sectors followed conservative approaches to IS because of the extensive regulations in these industries. Suggested one CIO, "where safety is a concern, we can't be too innovative and risk-taking." Another example of the conservative IS approach can be found in Sprint. Following the merger of Sprint and Nextel, the IT department reconfigured its IT resources to reduce operational and capital expenditures and as a result achieved \$424 million in cost savings (LaFave, Branch, Brown, and Wixom 2008). The reduction was accomplished by using both new and proven practices to facilitate the IT resource reconfiguration (LaFave et al. 2008). This focus on process efficiency and cost reduction reflects an IS Conservative strategy.

Lastly, an *IS Undefined* strategy is one that does not have an articulated approach or long-term goals for the firm to either explore or exploit the use of IS for strategic purposes. Furthermore, it does not follow a consistent behavioral pattern in its investment in, deployment, use, and management of IS. The firm with an IS Undefined strategy views IS strategy more as an afterthought rather than as a perspective to either explore or exploit IS to meet its organizational goals. It may initially seem farfetched

that any organization would not have a defined strategy for IS, but according to a 2002 study by Cutter Consortium, 39 percent of firms surveyed had no formal IS strategy (Slater 2002). Furthermore, we corroborate that data from a sample of 45 organizations worldwide collected in late 2009 by Cutter Consortium using the validated items from Chen et al. showed that over 13% of the firms can be categorized as having an IS Undefined strategy (Leidner, Lo, and Gonzalez 2010). In addition, our CIO interviews revealed that quite a few companies represented in the interviews did not have an articulated IS strategy prior to the time the CIO began the job. At least eight CIOs stated that no written IS strategy existed when they started their tenure as CIO and at least one still did not have a written strategy for IS. Some of the reasons given for the lack of a defined strategy prior to the current CIO's tenure were that the company had been fairly new, the company lacked good IT leadership, or simply that there had been no incumbent CIO prior to the current CIO. As a CIO of an organization in the transportation industry stated, "This job was created three years ago and I'm the first person in it. [The company] had a consulting study done about its use of technology, and what the consulting study said was 'you've got pockets of technology all over the agency, going in different directions. What you need to do is hire a CIO, pull it all together, and develop a cohesive strategy'". In contrast, one company that still did not have a formally written IS strategy did not see the need for one and also had no plans in the near future to develop an IS strategy. Another reason for a nebulously defined IS strategy is related to high uncertainty—the IS strategy is temporarily undefined during times when the company is in poor financial standing and also during economic recessions. From our CIO interviews, one CIO, who had more than 10 years of job tenure, indicated that his IS

strategy had, over the years, cycled through conservative to innovative to undefined IS approaches. He remarked:

I think a lot of it has to do with the business cycle that you're in. When I came onboard here, IS was very conservative, didn't do a lot of new stuff, kind of 'just kept the lights on,' a little more than defined and kind of followed what others did, but it certainly wasn't innovative. Then we went through a period of time where we went in and tried to change out a lot of systems, and that was one reason that they brought me onboard, because I had a history of changing things around. So, we really became an innovator...and tried to upgrade the systems and upgrade the capabilities that the company had. Then, we...had a lot of debt, so we didn't do as much for a few years. About the time we were coming out of that, the recession hit, so we were kind of in that undefined area, where we didn't really have a strategy.

Although by definition, the three IS strategies proposed are mutually exclusive (mutual exclusivity was confirmed in Chen et al.'s factor analysis using a sample of 174 U.S.-based organizations to validate their IS strategy measures), there is conceivably a fourth strategy—a firm can be ambidextrous, to some degree exhibiting both explorative and exploitative IS strategic behaviors. Prior research has even argued that firms should strive for ambidexterity (Galliers 2006; March 1991) in order to derive higher levels of firm performance, but despite the arguments for ambidexterity, few studies have found that organizations are capable of being at the same time highly innovative and highly efficient (Benner and Tushman 2003; He and Wong 2004; O'Reilly and Tushman 2004; Smith and Tushman 2005). Therefore, some researchers argue that it is more likely in practice that an organization is implicitly or explicitly innovative, conservative, or have an undefined IS strategy (Chen et al. 2010). We agree with their assessment and can substantiate this with data from a recent study of credit unions. Data collected from a sample of 263 U.S.-based credit unions showed that only 6% rated high on being both IS Innovative and IS Conservative (4 or more on a 1 to 5 scale) (Leidner, Lo, and Preston

2011). Moreover, the factor analyses of the three samples mentioned (i.e. Chen et al. 2010; Leidner et al. 2010; Leidner et al. 2011) showed high loadings within the three proposed IS strategies and low cross loadings, suggesting the distinctiveness of the three IS strategy concepts.

Existing Operationalization of IS Strategy Typology

Using a sample of high level business executives from 174 U.S.-based organizations, Chen et al. (2010) developed and tested the measures for the above presented IS strategy typology. We will adapt their items for measuring the three IS strategies, with slight modifications as discussed in the Methods chapter. The original items are depicted in Table 2.1.

Table 2.1. IS Strategy Typology Scales

| Construct | Items |
|-----------------|--|
| IS Innovator | Our organization is a leading IS innovator in our industry. Our organization believes in being first in the industry in developing new IS initiatives even if not all of these efforts prove to be highly profitable. Our organization responds rapidly to early signals concerning areas of opportunity for IS. |
| IS Conservative | Our organization follows a safe and stable approach to developing new IS initiatives. Our organization adopts promising IS innovations once these initiatives have been proven in our industry. IS innovations are carefully examined before they are chosen by our organization. |
| IS Undefined | Our organization does not have definitive long-term IS goals. Our organization does not have an articulated IS strategy. Our organization does not have a consistent pattern of behavior regarding IS. |

Source: Adopted from Chen et al. 2010, table 3. Copyright © 2010, Regents of the University of Minnesota. Used with permission.

Note: Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

Critique of Existing IS Strategy Conceptions and Typology

We have interposed some of our own assessment of the Chen et al. (2010) typology of IS strategy throughout the previous sections of this chapter, but in this section we provide our overall assessment of the potential contributions and limitations of the typology. We believe that Chen et al. (2010) have forwarded a significant contribution to the IS strategy literature by taking a step back to explicitly provide a unifying definition and operationalization of IS strategy. This was a necessary step because much of the prior literature appears to take for granted that readers and researchers understand what an IS strategy is. However, from the divergent conceptualizations of IS strategy that implicitly exist in the literature, we can see that there is actually no general consensus on the concept of IS strategy among the research community. By forwarding a definition of IS strategy that is more inclusive of other conceptualizations, Chen et al. provide a conception that unifies other implicit definitions of IS strategy. The proposed conception is inclusive because it is defined as a shared perspective rather than, for example, as an explicit or formally written strategy. A shared organizational view is like an organizational culture; while culture does not necessarily exist in written form, it is a code that is understood by members and which drives their attitudes and behavioral patterns (Schein 1985b). We believe that by defining IS strategy as a shared perspective, it has the most potential to encompass and unify other conceptions of IS strategy, which contributes to the furtherance of IS strategy research.

The proposed IS strategy typology is based on prior IS research that has argued that IS basically has two primary functions—that it can be used as an enabler of innovation or that it can be used as a means of cost-reduction by enabling automation

(e.g. Aral and Weill 2007; Heath 2009; Tai and Phelps 2000; Weill 1992). We believe that this typology serves as a parsimonious representation of distinct IS strategies and it is also grounded in the explorative-exploitative capability framework in the organizational learning literature (March 1991). Chen et al. not only proffer a typology of IS strategy, but also provide a validated operationalization of it that future research can readily use to assess a firm's IS strategy.

Notwithstanding the contributions, there are some potential limitations with the proposed IS typology. We believe it remains to be seen whether the three types of IS strategies are comprehensive enough to categorize most IS strategies. While parsimony is a goal to strive for in categorizations, it should also be counterbalanced with comprehensiveness. Perhaps an ambidextrous IS strategy, which is a combination of innovative and conservative strategies, exists in a larger percentage of organizations than we initially think. This is possible since the 6% of firms that rated highly on both innovative and conservative mentioned earlier is assessing a sample specifically of credit unions. Firms outside of the credit union industry may observe a larger percentage of ambidextrous organizations. Additionally, some firms may be middle-of-the-road on being both innovative and conservative; thus, if these firms were categorized as ambidextrous, there may be a larger percentage of ambidextrous firms than the 6% observed. Moreover, another potential strategy may exist, one that we might term as a "follow the economic cycle" strategy where a firm does have a well-defined strategy, but is inconsistent in its long-term approach to strategic IS investments and management. This strategy is one in which the firm takes an innovative approach during economic upswings and takes a conservative approach during downturns because many IT

departments receive relatively low levels of funding during economic downturns and significantly more funding during upturns (Heath 2009). Though limitations exist in the existing IS strategy typology, as with any work, we view this typology as an impetus from which to further the research work on IS strategy.

Dynamic Capabilities

Besides strategy type, the other key concept comprising our theory of IS strategy is dynamic capabilities. Since the principal purpose of private organizations is to produce profit, the literature on business competition would be an appropriate place in which to draw on theory for the current research focus. An organization may have a shared perspective on how to invest in, deploy, use, and manage IS, but such shared perspective does not alone guarantee superior organizational performance. For the firm to potentially sustain a competitive advantage, it must possess resources that are valuable, rare, inimitable, and nonsubstitutable (Barney 1991). The IS resources that are most able to meet these attributes and likely to sustain a competitive advantage are the organization's managerial IS knowledge and skills (Mata, Fuerst, and Barney 1995). These skills are capabilities by which firms integrate and reconfigure competencies, especially to address rapidly changing environments, and become the source for retaining a firm's competitive advantage (Eisenhardt and Martin 2000).

In today's business environment, the speed of industry change is driven more and more by rapid changes in production and process technologies (Nadkarni and Narayanan 2007) and many firms struggle to assimilate new technology given the rate at which information technologies change (Wheeler 2002). Essentially, the competitive environment has become dynamic. Environmental dynamism, elsewhere referred to as

environmental turbulence (Slater, Olson, and Hult 2006), competitive uncertainty (Simerly and Li 2000), and industry clockspeed (Fines 1998; Nadkarni and Narayanan 2007), characterizes the degree and instability of changes that a firm must face in its competitive environment (Eisenhardt and Martin 2000; Simerly and Li 2000), much of which is related to rapid changes in information technology. Since the 1990s, interest in analyzing organizational performance under these dynamic environments has grown (e.g. Eisenhardt and Martin 2000; Pavlou and El Sawy 2010; Teece et al. 1997; Wheeler 2002) as researchers feel the need to address firm performance in light of such conditions. Following this precedence and guided by the competitive advantage literature, specifically the dynamic capabilities perspective, we integrate dynamic capabilities into the proposed theory of IS strategy.

According to the dynamic capabilities perspective, an extension of the resource-based view, firms demonstrating the ability to provide flexible product innovations and timely responses in dynamic business environments will be the ones able to achieve competitive advantage in such settings (Teece et al. 1997). Dynamic capabilities refer to a firm's "ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al. 1997, p. 516). These capabilities evolve through various learning mechanisms, such as through repeated practice, learning from mistakes, the pace at which opportunities come about to learn, and market changes (Eisenhardt and Martin 2000). As one example, firms that have the opportunity to repeatedly practice business acquisitions tend to accumulate both the tacit and explicit knowledge about how best to implement acquisitions in order to achieve superior

acquisitions performance (Zollo and Singh 1998). The various learning mechanisms all contribute to the development of dynamic capabilities in a firm.

The concept of dynamic capabilities originated from the strategic management literature (e.g. Eisenhardt and Martin 2000; Helfat and Peteraf 2003; Teece et al. 1997; Winter 2003) and as such, much of these capabilities are related to the firm level and may or may not necessarily involve information technologies. For example, recognized in studies as different types of dynamic capabilities are: strategic flexibility—the ability to adapt to changes in the environment by continuously changing the firm’s current strategic actions, asset deployment, and investment strategies (Nadkarni and Narayanan 2007); strategic political management—the ability of firms to plan and act politically in order to maximize economic returns from the political environment (Oliver and Holzinger 2008), strategy formation capability—the ability of firms to effectively and efficiently form its strategy (Slater et al. 2006), and top management team (TMT) polychronicity—the extent to which TMT members engage in multiple tasks simultaneously or intermittently rather than sequentially and believe that this is the best way of doing things (Souitaris and Maestro 2010).

Therefore, though an assortment of dynamic capabilities exist in the literature, we identified two capabilities based on the dynamic capabilities perspective that are especially related to the abilities created and enabled by IS and are thus particularly relevant to this study of the IT business unit. These are the IT unit’s absorptive capacity and agility. *Absorptive capacity* refers to an organization’s ability to acquire internal and external information, assimilate it, and apply the new gained knowledge to produce an organizational capability that can effectively respond to turbulent market and industry

environments (Cohen and Levinthal 1990; Tu, Vonderembse, Ragu-Nathan, and Sharkey 2006; Zahra and George 2002). Absorptive capacity has been assessed in a multitude of studies both in organizational research and IS research, and the construct, absorptive capacity, has been used in over 900 peer-reviewed academic papers since its inception in 1989 (Lane, Koka, and Pathak 2006). The popular development of this literature stream can be attributed partly to the unique perspective provided by the construct and partly to its overlap with other trending areas of organizational practice and research that were growing at that period of time (Lane et al. 2006). According to Zahra and George (2002), absorptive capacity consists of two subcomponents: potential and realized absorptive capacity. Potential absorptive capacity reflects a firm's ability to acquire and assimilate new information (the former part of the definition), while realized absorptive capacity is a function of the firm's ability to transform the newly acquired information into knowledge and apply or exploit this knowledge for organizational gains (the latter part of the definition). Both potential and realized absorptive capacity play separate, but complementary roles and coexist in the organization at all times (Zahra and George 2002). Each subset of absorptive capacity cannot, by itself, improve firm performance—firms would be unable to apply knowledge without first acquiring and assimilating information and even if they were able to acquire and assimilate information, they would remain unable to use this information for performance gains if they did not possess the ability to apply or exploit it (Zahra and George 2002). Rather, both potential and realized absorptive capacity are required to effectuate firm performance.

The other dynamic capability, *agility*, refers to an organization's ability to continuously sense environmental change and respond to market opportunities with speed

and surprise (Overby, Bharadwaj, and Sambamurthy 2006; Sambamurthy, Bharadwaj, and Grover 2003) and is considered to be essential for competitive success (Brown and Eisenhardt 1997). Changes in the environment encompass a kaleidoscopic range of events, including changes in competitors' actions, consumers' preferences, legal regulations, economic shifts, and technological advancements (Overby et al. 2006). The concept of agility likely emerged from the manufacturing literature where agile manufacturing referred to a firm's ability to prosper in a dynamically competitive environment by quickly and effectively reacting to customer-driven market changes (Sherehiy, Karwowski, and Layer 2007). Agility consists of two components: the ability to detect and the ability to respond to the detected stimuli in the environment (Overby et al. 2006). Parallels can be drawn between the two components of agility and the characteristics of absorptive capacity—both agility and absorptive capacity consist of some form of sensing or acquiring information and responding to or applying it. Although absorptive capacity and agility are related, the divergence lies in what each is able to manage. Whereas absorptive capacity primarily refers to a firm's ability to manage *knowledge* and operates on a more continuous basis, agility refers to a firm's ability to manage *change* in the environment and applies more to episodic events resulting from these changes (Overby et al. 2006).

CHAPTER THREE

Hypotheses

Theory of IS Strategy: A Theory for Explanation and Prediction

In this chapter, we propose a theory of information systems strategy. The dictionary definition of the word *theory* can take on various meanings and the perspectives on theory depend, to some degree, on different philosophical and disciplinary orientations (Gregor 2006). Yet, despite these differences, there exists commonalities. Gregor (2006) draws upon four philosophical disciplines—the natural sciences, the social sciences, the interpretivist tradition, and the sciences of the artificial—to provide an encompassing definition of theory and to classify theories into a taxonomy of five types of theory that are relevant to the information systems discipline. She defines theory as “abstract entities that aim to describe, explain, and enhance understanding of the world and, in some cases, to provide predictions of what will happen in the future and to give a basis for intervention and action” (p. 616) and classifies theory as theories for: (1) analysis, (2) explanation, (3) prediction, (4) explanation and prediction, and (5) design and action. Theories for analysis are intended to describe what is; they are not intended to offer explanations for causal relationships or make predictions. Theories for explanation go beyond those for analysis and are intended to provide explanations of certain phenomena; however, they are not intended to make predictions. Theories for prediction are intended to provide predictions, but do not have well-developed explanations for causal relationships. Theories for explanation and prediction, the fourth type of theory, are intended to encompass the first three types of

theories. These theories describe what is as well as offer explanations and predictions in the form of testable propositions. Lastly, theories for design and action give explicit prescriptions on how to do something and can be in the form of methods, techniques, or principles. Table 3.1 shows the taxonomy of theory types as proposed by Gregor (2006).

Table 3.1. A Taxonomy of Theory Types in Information Systems Research

| Theory Type | Distinguishing Attributes |
|--------------------------------|---|
| I. Analysis | Says what is. The theory does not extend beyond analysis and description. No causal relationships among phenomena are specified and no predictions are made. |
| II. Explanation | Says what is, how, why, when, and where. The theory provides explanations but does not aim to predict with any precision. There are no testable propositions. |
| III. Prediction | Says what is and what will be. The theory provides predictions and has testable propositions but does not have well-developed justificatory causal explanations. |
| IV. Explanation and prediction | Says what is, how, why, when, where, and what will be. Provides predictions and has both testable propositions and causal explanations. |
| V. Design and action | Says how to do something. The theory gives explicit prescriptions (e.g., methods, techniques, principles of form and function) for constructing an artifact. |

Source: Adopted from Gregor 2006, table 2. Copyright © 2006, Regents of the University of Minnesota. Used with permission.

Using the typology of IS strategy, our research proffers the fourth type of theory in Gregor’s (2006) taxonomy, a theory of IS strategy, that seeks to explain why a firm adopts a certain IS strategy and to predict the organizational outcomes of such a strategy. In doing so, our theory also describes each concept related to IS strategy in a model proposed for research. Our conceptual framework is illustrated in Figure 3.1. As shown in the figure, we draw upon two major perspectives or literature streams to formulate the research model. The left side of the framework, the antecedents, is identified based upon the power and politics perspective while the right side of the framework, the impacts, is

based upon the dynamic capabilities perspective. The reasons for choosing to draw upon these two particular perspectives are explained in the subsequent sections of the chapter regarding the antecedents and impacts of IS strategy.

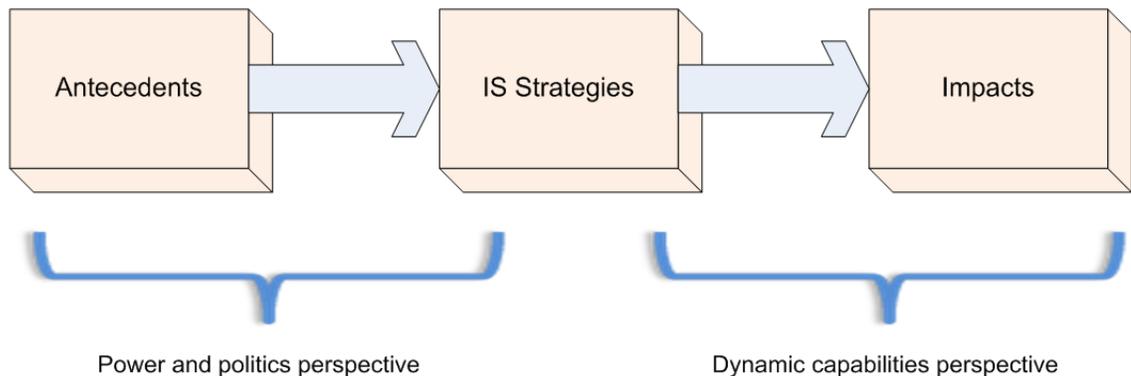


Figure 3.1. Conceptual Framework

From the conceptual framework, we develop an overall model for research as represented in Figure 3.2. The principal layout of the research model includes antecedents of IS strategy, which help explain how and why a firm comes to adopt to a greater extent one strategy over another, and impacts of IS strategy, which provide predictions of the outcomes of the strategies. However, we also theorize that the impacts of the IS strategies are mediated through the development and sustenance of certain organizational assets called dynamic capabilities. The proposed model is intended to offer a Type IV theory (Gregor 2006), providing explanation and predictions of a firm's IS strategy. Portions of the overall model will be illustrated in smaller, dedicated figures as each part is discussed in turn.

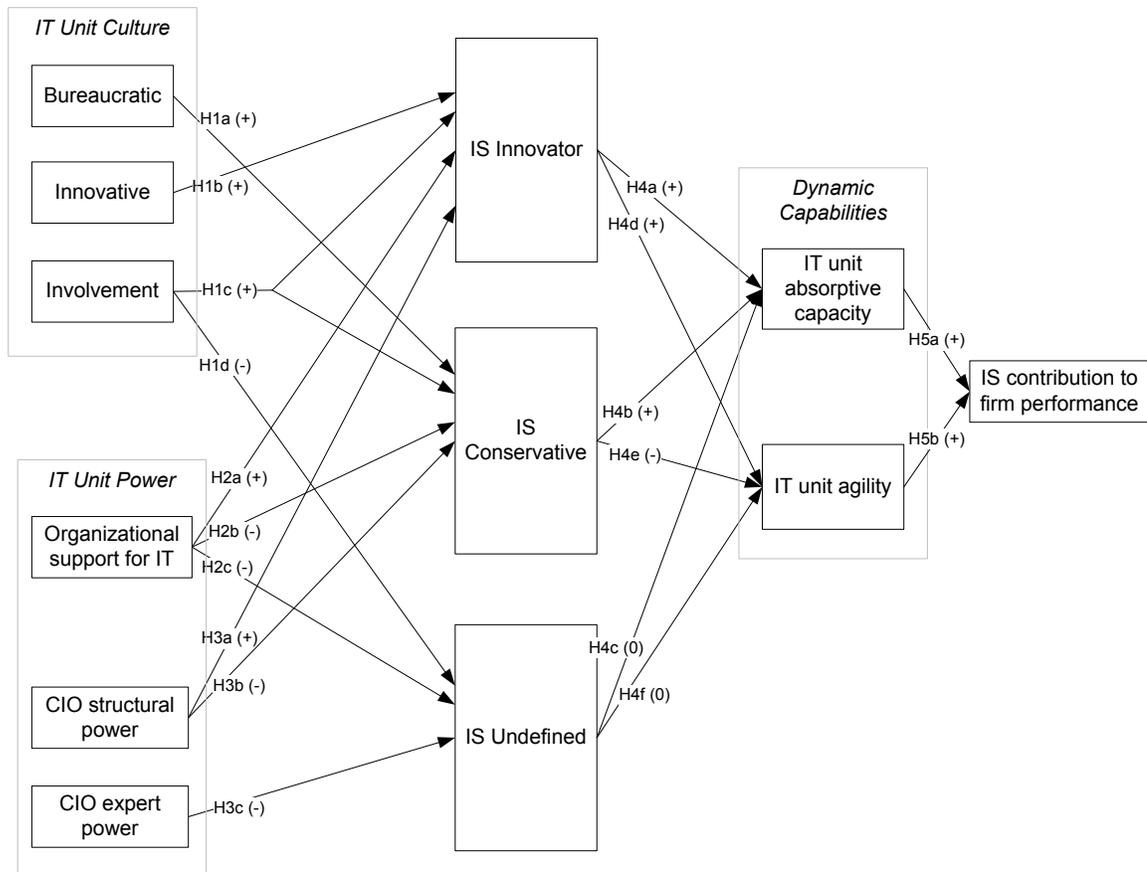


Figure 3.2. Overall Research Model

Antecedents to IS Strategy

Different aspects of the IT department's environment can shape its perspectives regarding its strategy. To identify the appropriate antecedents to IS strategy, we draw upon the power and politics perspective from the strategic decision making literature (Eisenhardt and Zbaracki 1992). The IT department's IS strategy can be thought of as a set of strategic choices or decisions that the organization makes. For example, the decision to follow an innovative approach to IS investment is made and carried out by the organization's members. Although strategic decisions are mostly based on rationality, they are also dependent on the social environment of the organization (Eisenhardt and Zbaracki 1992), for instance, the organization's culture and political landscape.

Organizational culture influences members' behaviors because people tend to behave in ways that are consistent with their values and culture is a set of values shared by organizational members (Schein 1985b). People's rationality is also bounded, so when conflicts of decisions arise, the decision makers with the greatest political power will win conflicts (Eisenhardt and Zbaracki 1992). The organizational members who are most likely to make strategic types of decisions are people who have power and political influence in the organization. Therefore, we suggest that the power and politics perspective from the strategic decision making literature is an appropriate lens through which to identify and examine the relationships between the antecedents and IS strategies. Extrapolating from this perspective, the most notable antecedents to IS strategy are characteristics and attitudes related to the IT department and the CIO, who is the leader of the IT department. The antecedents can be conceptually divided into two facets, each of which has credibility in molding the department's views regarding IS: the IT unit's culture and the IT unit's power (which comprises of the power of the department and the power of the CIO). Each of these concepts will be explained in detail.

IT Business Unit Culture

In order to assess the IT unit culture, the concept of organizational culture, which is also applicable to subunits within the organization, must first be discussed.

Organizational culture has been defined in a multitude of ways. Some have defined culture in terms of less observable aspects, such as ideologies, beliefs, assumptions, shared values, understandings, and the collective will (Sackmann 1992) while others have defined culture in terms of more observable artifacts such as norms, practices (DeLong

and Fahey 2000; Hofstede 1998), symbols (Burchell, Clubb, Hopwood, Hughes, and Nahapiet 1980), language, myths, and rituals (Pettigrew 1979). Schein's (1985a, 1985b) three-level model of culture describes both the more observable aspects of culture and the less observable ones. The first level is the core level and consists of basic assumptions. These assumptions are schemes that people use to interpret situations in order to make sense of events, activities, and human relationships (Van Maanen and Barley 1985). They evolve over time as a group develops strategies to deal with problems and transfers these strategies to new group members (Van Maanen and Barley 1985). The second level consists of values that are more apparently manifested and these manifestations convey the beliefs that are important to a particular group. While values are more visibly interpretable than assumptions, Schein makes clear that values merely reflect the underlying assumptions of a group. Values are, in a sense, a set of social norms that define the rules by which members of a group should act and communicate (DeLong and Fahey 2000; Nadler and Tushman 1988). The third level of culture is manifested in observable artifacts and behavioral patterns, such as art, technology, myths, language, and rituals (Pettigrew 1979). Although the third level of culture is the most observable of Schein's three-level model, it may be more difficult to interpret the underlying meaning of the manifestations of this level than the other two levels (Leidner and Kayworth 2006).

To focus the scope of culture in the current research, we examine the values-based level of culture following the precedence of a majority of work that has explored the relationship between culture and social behaviors (Posner and Munson 1979). Following this approach, an organization's culture can be thought of as the social environment in which decision making occurs. This environment is shaped by the organization's

political landscape and impacts members' strategic choices and decisions (Eisenhardt and Bourgeois 1988).

Researchers have advanced different conceptualizations of both national and organizational cultures (Leidner and Kayworth 2006). These various conceptualizations of culture all have valuable applicability within the context of a variety of studies and hence researchers adopt the conceptualization(s) that are most applicable within the context of their studies. However, one conceptualization of culture may not serve an exact fit for a study (e.g. Li, Hess, McNab, and Yu 2009). Therefore, for the context and purpose of our study, we draw a combination of dimensions from two different conceptualizations of organizational culture that are most applicable to this study. It is believed that the use of organizational culture dimensions is appropriate for this study because the study examines the IT unit as its own entity within the overall firm and is not comparing IT department culture with other department cultures. Moreover, since subcultures can exist in a firm, it would make sense to capture the culture that exists most prevalently for the entity that is being studied (Wallach 1983).

Of the two conceptualizations of organizational culture applicable to this study, one that has been widely used (e.g. Bock, Shin, Liu, and Sun 2010; Kanungo, Sadavarti, and Srinivas 2001; Rigas, 2009; Shadur, Kienzle, and Rodwell 1999; Yiing and Ahmad 2009) is Wallach's (1983) taxonomy of cultures where organizational cultures are classified as bureaucratic, innovative, or supportive. Although an organization may not fit exclusively into one category, it will fit, to varying degrees, into these three categories (Wallach 1983). Bureaucratic cultures are hierarchically structured with clearly defined lines of authority and responsibility based on control and power. The environment in a

bureaucratic culture is stable and the organization is cautious; the work in such a culture is organized and systematic with efficient systems and procedures. In contrast, innovative cultures are dynamic and the work places of such cultures are creative, having work that often involves challenge and risk. However, the constant pressure to achieve brings about occupational stress and burnout for many employees. Supportive cultures are different from both bureaucratic and innovative cultures. The work environment in a supportive culture is “warm and fuzzy” and people are friendly, fair, and helpful. The culture is relationship-oriented and characterized by openness, harmony, and trust. How a supportive culture relates to IS strategy seems ambiguous and is difficult to justify theoretically, and therefore will be excluded from this study. However, relevant to our study of IS strategies are Wallach’s (1983) *bureaucratic* and *innovative* culture dimensions and as such, these will be adopted into the current study.

The other conceptualization of the values-based level of culture is Denison and Mishra’s (1995) categorization of organizational culture into four indexes: involvement, consistency, adaptability, and mission. Involvement refers to the level of participation and collaboration by organizational members in the firm’s decisions that affect them. It reflects members’ sense of ownership, commitment, and responsibility to the organization. Consistency refers to the degree of normative integration, i.e. the extent to which values and expectations are held uniformly by organizational members. Consistency cultures value stability and rely on explicit rules and regulations as control systems. Normative integration requires that individuals conform to codes of behavior rather than voluntarily participate in shared codes of conduct. A high level of shared meaning can act as a central source of integration, coordination, and control within the

organization. This type of culture has some overlap with Wallach's (1983) bureaucratic culture. Adaptability reflects an organization's capacity to make internal changes in response to external conditions. And mission refers to the degree to which organizational members have a shared sense of long-term purpose and direction for the firm. The adaptability and mission cultures have a high degree of correspondence with existing concepts in the current research model. Adaptability is quite similar to the concept of agility, which will be described later in this chapter, and mission is akin to the IS strategies themselves—the degree to which the organization has a shared perspective with regard to IS. As such, adaptability and mission will not be included in the current study. Of Denison and Mishra's (1995) four culture dimensions, involvement and consistency are most applicable to the study, but since consistency culture also overlaps with bureaucratic culture, only *involvement* culture is adopted for this study. The bureaucratic culture dimension is chosen over consistency culture because it ties more closely with the context of the study.

Though strong organizational cultures will be pervasive throughout an organization, cultures are not necessarily uniform throughout (Wallach 1983). Many subcultures can exist within a firm in various divisions, locations, and functional areas, for instance (Wallach 1983). For this reason and because we wish to examine the IT department's IS strategy, we assess the culture of the IT department in particular. The inclusion of culture is important in the current study of IS strategy because an organization must have a match or fit between its strategy and its culture in order for it to successfully and continuously follow its strategy (Lines 2004; Yemm 2006). This alignment between culture and strategy is imperative because a mismatch can potentially

sabotage an organization’s effective implementation of its strategy (Yemm 2006). The detailed model in Figure 3.3 illustrates the proposed relationships between organizational cultures and IS strategies. Although it is possible that a strategy can be imposed upon an organization by its upper level management, which subsequently forces a cultural change, cultures have been thought by many researchers to be stable and persistent (Leidner and Kayworth 2006). Hence, it is hypothesized that the cultures theoretically have an influence on the IT unit’s choice of IS strategy. Each of the relationships is discussed next.

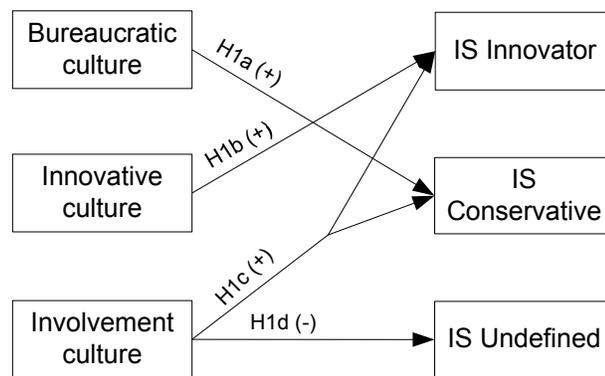


Figure 3.3. Relationships between Organizational Cultures and IS Strategies

Bureaucratic culture and IS Conservative strategy. The organization that adopts an IS Conservative strategy is not a risk taker but prefers to minimize risks by carefully assessing the overall performance of new systems introduced into its industry before implementing or otherwise investing in them (Chen et al. 2010). Thus, the performance of an IS Conservative is judged more by its efficiency gains than by its effectiveness results, or gains from innovations that create a competitive advantage for the firm. Correspondingly, a bureaucratic organizational culture has matching characteristics—an

organization with such a culture is cautious and risk averse, and the culture puts value on work efficiency rather than innovativeness (Wallach 1983). Cultures that are hierarchical, i.e. control-oriented and focused on the internal organization, much as bureaucratic cultures are, tend to be imitators or followers of a technology in the industry rather than early adopters or innovators (Naranjo-Valencia, Jiménez-Jiménez, and Sanz-Valle 2011). For example, a study of 471 Spanish manufacturing firms found that those firms that had a hierarchically oriented culture were associated with being imitators or followers of technology innovations related to both their products and processes rather than being early adopters or pioneers of technology (Naranjo-Valencia et al. 2011). Hence, we believe that it is in bureaucratic types of cultures that the IS Conservative strategy can be embraced into the culture and even thrive and thus it is hypothesized:

H1a: Bureaucratic cultures are positively associated with IS Conservative strategies.

Innovative culture and IS Innovator strategy. Unlike the IS Conservative, the IS Innovator is willing to take informed risks by aspiring to be innovative through new IS initiatives and seeking to explore new, uncertain alternatives (Chen et al. 2010). Efficiency gains are not as important for the IS Innovator as are effectiveness gains through IS innovations. Effectiveness gains are brought about through creativity and risk-taking more so than through conservative, incremental plans and actions. For example, the impact that the introduction of a radical innovation with IS has on the value of a firm is likely to exceed that of the implementation of a standardized, off-the-shelf solution that is commonplace in an industry regardless of the efficiency that it brings. Prior research has shown that investors react positively to organizational announcements

of investments in innovative types of IS, but not to investments in IS that have been commodified, regardless of the industry in which the organization belongs (Dos Santos, Peffers, and Mauer 1993). However, for such an innovative IS strategy to be successful, it needs not only to be supported, but reinforced by the organizational environment. An innovative culture provides this reinforcement because the culture rewards individuals for their creativity and results-orientation, which often involves informed risk taking. For example, Intel Corporation, a company known for its innovativeness that was ranked number 12 in *Business Week's* 50 Most Innovative Companies worldwide in 2010 (Arndt and Einhorn 2010), has a culture that values risk taking and results-orientation. It is a culture where rewards are based on merit and innovation is embraced (Karlgaard 2011). Through its innovative culture, the company was able to retain its place as an innovation leader over the decades since its founding in 1968.

Since risk taking is inherent in innovative cultures, these cultures support innovative types of IS strategies and hence make them the likely environments in which the IS Innovator strategy is welcomed. The study of Spanish manufacturing firms mentioned earlier found that adhocracy cultures, i.e. cultures that are externally-focused and emphasized flexibility and change, were associated with being early adopters and pioneers of technology (Naranjo-Valencia et al. 2011). Similarly, innovative cultures should foster innovative IS strategies and therefore, the next hypothesis is stated as follows:

H1b: Innovative cultures are positively associated with IS Innovator strategies.

Involvement culture and IS strategies. In a culture that is high on involvement, members actively participate and collaborate in making decisions that affect them.

Organizational members feel a strong sense of ownership of and responsibility to the organization; they are in a sense highly committed to it (Denison and Mishra 1995). Research on the psychology of possession has linked feelings of ownership with positive attitudes about the object of ownership (Van Dyne and Pierce 2004). Psychological ownership has also been associated with organizational commitment and good citizenship behaviors (Van Dyne and Pierce 2004). Furthermore, in environments in which people feel a strong sense of ownership of the organization and commitment to both the organization and to other organizational members, people are also more likely to have a strong sense of purpose and goals and aspirations for their organization (e.g. Berzonsky 2003; Katzenbach and Smith 1993). This should hold true not only for the organization as a whole, but for smaller units within the firm, such as business units and work teams. For example, a study of high performance teams found that these team members are not only highly committed to each other, but that their commitment also leads to a deeper sense of shared purpose, more complete approaches, and more ambitious performance goals (Katzenbach and Smith 1993). They are more likely to have a long term outlook for their teams and to work proactively to achieve their goals rather than behave only reactively. In essence, involvement cultures are more likely to produce organizations or business units that have defined goals and objectives for their organizations and units. Thus, IT business units having a culture high on involvement would be more likely to have a defined (innovative or conservative) IS strategy. However, people who are less involved and feel uncommitted to their organizations or business units would be less likely to have a deep sense of shared purpose and less willing to endeavor and extend themselves towards their organization's or business unit's objectives. Consequently, IT

business units having a culture low on involvement should be more likely to have an IS strategy that is undefined.

Thus, the next two hypotheses are presented as:

H1c: Involvement cultures are positively associated with defined IS strategies, such that: Part i) Involvement cultures are positively associated with IS Innovator strategies, and Part ii) Involvement cultures are positively associated with IS Conservative strategies.

H1d: Involvement cultures are negatively associated with undefined IS strategies.

Organizational Support for IT

Based on the power and politics perspective, the concept of organizational support for IT has been identified as having a significant impact on an organization's strategic decisions regarding IS (Preston, Chen, and Leidner 2008). Organizational support for IT is defined as the extent to which the organization provides the necessary resources and empowerment to support the IT department and IS initiatives (Jarvenpaa and Ives 1991; Preston et al. 2008). The power and politics perspective suggests that in order to empower employees, the organization must provide them with the necessary resources to carry out their responsibilities (Yukl 2002). However, these resources are limited and power struggles exert forces over the distribution of the resources (Pfeffer and Salancik 1974; Salancik and Pfeffer 1974). A set of field studies, notably those of Pfeffer and colleagues, have concluded that power and resources received in organizations are correlated such that the more powerful departments are granted more of the organization's resources (Pfeffer and Salancik 1974; Salancik and Pfeffer 1974). Not only do these departments receive more of the organization's funds in general, but they

also receive more of these funds especially when the resources are scarce (Hills and Mahoney 1978; Pfeffer and Moore 1980). We argue that organizational support for IT grants the department more power within the firm and that this will have an influence on the choice of, or at least the ability to carry out, an IS strategy as illustrated in Figure 3.4.

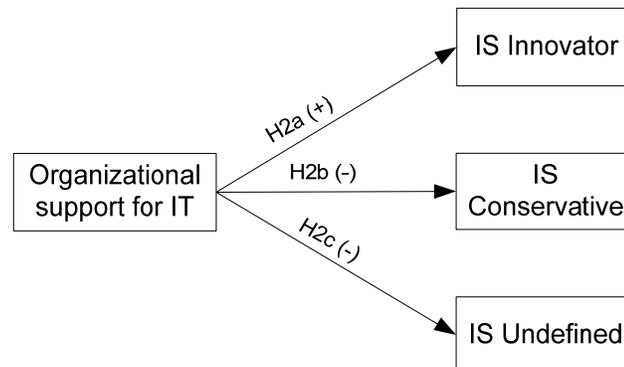


Figure 3.4. Relationships between Organizational Support for IT and IS Strategies

In order to implement an innovative IS strategy, an organization must be able to absorb the risks that are involved with an innovative approach without those risks leading to its detriment (Hirsch, Friedman, and Koza 1990). Swanson (1994) argued that an organization's slack resources significantly contribute to its ability to experiment with pilot projects, which can be critical to implementing and adopting innovations. Firms with more slack resources would be in a better position to absorb the costs associated with failure while trying innovations (Grover, Fiedler, and Teng 1997). In a similar sense, the IT department must also be able to absorb the risks associated with an innovative IS strategy if it were to consistently apply such a strategy. This ability to absorb the impact of risks associated with experimentations and pilot projects depends, in part, on the resources available for the department's use. The allocation of available

resources reflects the organization's support of the department, which is partly subject to the business orientation of the firm (Swanson 1994). For instance, if the business orientation of the firm relies heavily on IS expertise, such as the reservation systems of the airline industry, then the firm may tend to be more supportive of IS innovations in order to drive its business strategy (Swanson 1994). Departments that receive the most organizational support will also receive the largest proportion of the organization's available resources (Pfeffer and Salancik 1974; Salancik and Pfeffer 1974). This endowment of a favorable amount of resources likely allows the IT department to explore different IS alternatives. As such, organizational support for IT provides the department with more of the organization's resources and funding to facilitate the department's implementation of an innovative IS strategy, and consequently it is hypothesized:

H2a: Organizational support for IT is positively associated with IS Innovator strategies.

Unlike IS Innovator strategies, IS Conservative strategies are not considered to be risky because they seek a stable approach to IS by exploiting existing organizational resources in order to minimize operating costs (Chen et al. 2010). Therefore, they are the safe approach to IS even when the organization does not allocate superior funding to the IT department and IS initiatives. Without organizational support, the department would have little slack to absorb the costs associated with IS experimentations, especially during difficult economic periods when resources are particularly scarce (Hills and Mahoney 1978; Pfeffer and Moore 1980). While it can be argued that in a healthy economy the IT department should expect to be provisioned according to the overall slack resources available to the firm (Swanson 1994), the ability of the department to consistently take

risks in experimenting with innovations would still be dependent on the economic cycles. It might also be argued that the IT department could preserve the extra monetary funding it receives during economic booms and use it sparingly to cover risks during economic downturns so that the department could still attempt to innovate to a certain extent; however, this would be difficult to do and perhaps not the norm in most departments. The inability to take a consistent approach to IS innovations due to the lack of organizational support should thus force the organization's IS strategy to be either one of IS Conservative or IS Undefined. It is therefore hypothesized that:

H2b: Organizational support for IT is negatively associated with IS Conservative strategies.

H2c: Organizational support for IT is negatively associated with IS Undefined strategies.

CIO Power

Top managers play a fundamental role in making strategic decisions for the firm and the CIO, being the highest ranking IT executive, by default has a certain amount of power over the strategic decisions related to IS within the organization. According to the power and politics perspective, power wins battles of choice (Eisenhardt and Zbaracki 1992) and not only does this concept apply at the department level, as previously discussed, but at the individual level as well because the decisions of the most powerful people will prevail over the less powerful (Hinings, Hickson, Pennings, and Schneck 1974; March 1962; Salancik and Pfeffer 1974).

Power relationships and strategic choices in organizations are tightly interconnected (Child 1972; Finkelstein 1992) and thus we see the importance of

examining CIO power as it relates to the IT department's IS strategy. Power at the individual level is defined as "the capacity of individual actors to exert their will" (Finkelstein 1992, p. 506) and Finkelstein (1992) provides a framework that describes four dimensions of power relevant to top managers of organizations: structural power, ownership power, expert power, and prestige power. Structural power is perhaps the power that is most commonly cited in research and refers to a manager's power that is based on the formal structure and hierarchical authority of the organization (Finkelstein 1992). For example, the CEO has high structural power over other members of the firm's top management team. Ownership power refers to power that managers accrue based on their capacity to act on behalf of shareholders (Finkelstein 1992). For example, an executive who has a significant shareholding in the company will have more ownership power. Expert power results from an executive's ability to manage environmental contingencies and contribute to the organization's success (Hambrick 1981; Mintzberg 1983; Tushman and Romanelli 1983). Managers who have expertise in an area critical to the organization can significantly influence strategic decisions (Yetton and Bottger 1982). Lastly, prestige power reflects a top manager's personal prestige or status (Finkelstein 1992). This type of power results from how others in the institutional environment perceive the manager's personal influence and importance (Finkelstein 1992). While all four dimensions of power are relevant to the CEO, for our purposes, we examine structural power and expert power, which are more relevant to the CIO.

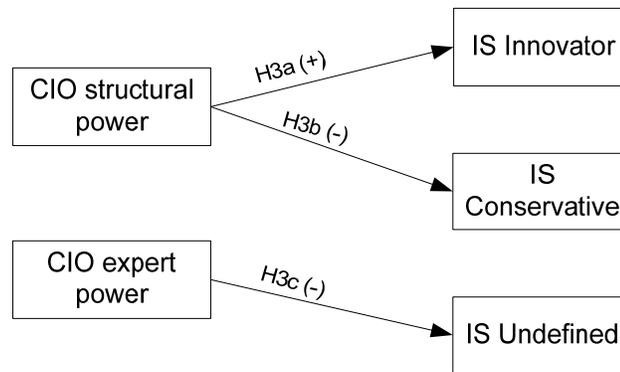


Figure 3.5. Relationships between CIO Power and IS Strategies

CIO structural power. It has been suggested in prior literature that an executive's structural power is more strongly correlated with his or her overall power level than are other dimensions of power (Finkelstein 1992). This formalized power bestows on the executive a basis of legitimacy and authority within the organization (Finkelstein 1992; Ocasio, 1994) and gives him or her greater control over organizational resources and over the actions of colleagues who have a lower power status (Finkelstein 1992). Since a CIO with greater structural power has greater control over available resources, he or she can also use these resources to enhance his or her own department, establishing the IT department as an organizational unit that effectively contributes to the firm. The CIO has incentive to establish the IT department because a department that contributes strategic performance gains to the firm would subsequently be acknowledged by other managerial elites in the organization and further increase the CIO's overall power level as well as the status of the IT department. In order to make a strategic impact on the organization, the department must take an innovative approach to IS. It has been well established in the competitive advantage literature that innovative IS solutions offer externally facing performance gains (Aral and Weill 2007; Dos Santos et al. 1993; Weill 1992), such as

gains in market share and sales revenue. An innovative IS strategy can offer the effectiveness gains that a conservative IS strategy is not designed to provide (Leidner et al. 2010). Therefore, a CIO with greater structural power and hence more access to organizational resources should be more inclined and better equipped in terms of gathering the necessary resources to implement an innovative IS strategy. As such, the next hypothesis is expressed as:

H3a: CIO structural power is positively associated with IS Innovator strategies.

However, CIOs with weaker structural power are in general not as likely to garner the same proportion of organizational resources as executives with greater structural power. Without the proper provision of slack resources, as we have previously argued, the IT department would be unable to absorb the costs of the risks that are associated with experimenting with innovations. Therefore, the CIO would be more disposed to adopt a more stable, conservative approach to IS.

H3b: CIO structural power is negatively associated with IS Conservative strategies.

CIO expert power. An executive's ability to manage uncertainties in the organizational environment to contribute to the success of the firm is reflective of his or her expert power (Hambrick 1981; Mintzberg 1983; Tushman and Romanelli 1983). Managers who build a network of relationships and contacts with elements of the task environment will cultivate their ability to manage contingencies that arise from that environment (Finkelstein 1992). The experience and learning gained by a CIO from managing such contingencies will increase his or her expert power, which will then influence the IS-related strategic choices the CIO makes for the firm as he or she is often

sought after for advice in his or her domain of expertise (Finkelstein 1992). As business strategy is essential to fulfilling the mission of the firm, so IS strategy is important to advancing the purpose of IS within the firm and to contribute to its success. While many have argued for the importance of aligning IS strategy with business strategy (e.g. Chan, Huff, Barclay, and Copeland 1997; Luftman et al. 1999; Preston and Karahanna 2009; Sabherwal and Chan 2001), few have disputed the importance of having an IS strategy. A CIO with greater expert power will recognize the importance of following a strategy for IS and will likely have defined goals for IS. His or her awareness of the various aspects of the business allows him or her to define an IS strategy that better fits the organization and puts IS in a position to best contribute to the success of the firm. The CIO's expertise decreases the possibility that the organization will have an IS strategy that is ill-defined or entirely undefined. Furthermore, the CIO's expert power will increase his or her level of credibility within the organization, which raises the likelihood that the chosen IS strategy will be supported. Hence, the following is hypothesized:

H3c: CIO expert power is negatively associated with IS Undefined strategies.

Development of Dynamic Capabilities

As discussed in the following sections, we believe that it is through the consistent experience of learning from implementations of IS strategies that facilitates a firm's development of both tacit and explicit knowledge and organizational ability, and that this knowledge and ability, known as dynamic capabilities, are the enablers of a firm's competitive advantage. The same is expected to hold true at the IT business unit level. The relationships between the IS strategies and dynamic capabilities—IT unit absorptive capacity and agility—are illustrated in Figure 3.6.

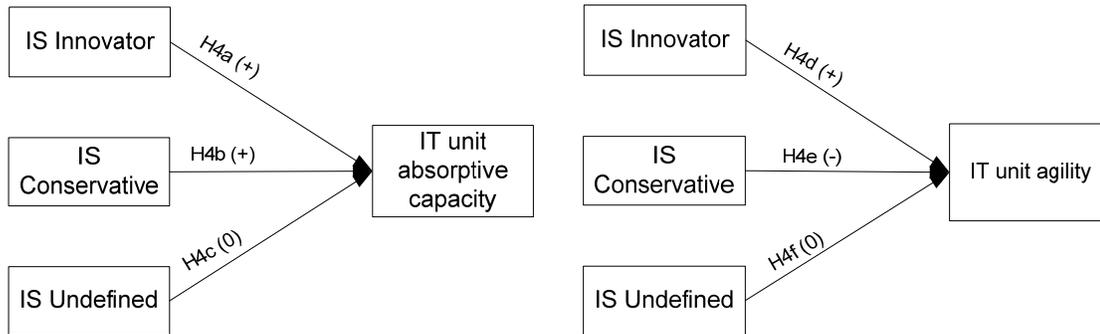


Figure 3.6. Relationships between IS Strategies and Dynamic Capabilities

IT Unit Absorptive Capacity

The IT unit's absorptive capacity refers to the IT department's ability to acquire information, assimilate it, and apply the newly gained knowledge to produce an organizational capability that can effectively respond to dynamic environments (Cohen and Levinthal 1990; Tu, Vonderembse, Ragu-Nathan, and Sharkey 2006; Zahra and George 2002). Several types of factors can contribute to the development of absorptive capacity, including prior related knowledge (Cohen and Levinthal 1990), knowledge scanning (Tu et al. 2006; Zahra and George 2002), and experience (Tu et al. 2006; Zahra and George 2002). Each can positively relate to a firm's learning, which aids the development of dynamic capabilities (Eisenhardt and Martin 2000). Prior related knowledge, as suggested by some psychologists, enhances learning because new information can be linked or associated with preexisting concepts already in memory (Bower and Hilgard 1981; Lindsay and Norman 1977). This form of associative learning helps the learner categorize knowledge and draw linkages across categories, thereby allowing the learner to make sense of and create new knowledge (Bower and Hilgard 1981). Learning from prior knowledge can be accomplished not only by individual

organizational members, but by the organization as well through the use of the firm's organizational memory, i.e. the "retention bin" of a firm's knowledge (Walsh and Ungson 1991). It is suggested that the wider and deeper is a firm's exposure to knowledge, the stronger is its inclination to explore new and related knowledge (Van Wijk, Van den Bosch, and Volberda 2001), which subsequently improves the firm's absorptive capacity (Zahra and George 2002).

In this manner, IT departments adopting innovative IS strategies are more likely to increase their absorptive capacity because they seek to explore new technological innovations to build business advantage. This exploration increases the breadth and depth of their knowledge exposure, which again strengthens their propensity to explore new knowledge in a cyclic pattern of continuous learning (this alludes to H4a, which will be formally stated later in this section). While IT departments implementing conservative IS strategies can also learn from prior knowledge related to searching for proven technological concepts in the industry, it is less probable that their exposure is as far reaching on the knowledge spectrum as is IS Innovators' since the focus of IS Conservatives is on maintaining stability and exploiting existing IS resources rather than exploring new alternatives. As such, compared to the IS Innovator, the IS Conservative, while still able to develop absorptive capacity, would be unable to increase its absorptive capacity as much or as rapidly as would the IS Innovator (this alludes to H4b, which will be formally stated later in this section). Nevertheless, since knowledge complementarity—the extent to which knowledge is both relevant to and different from already existing knowledge—is positively related to organizational learning (Lofstrom 2000), the prior knowledge of both the IS Innovator and IS Conservative would build

absorptive capacity because both are consistent in their approach to IS and therefore pursue information that complements their preexisting knowledge. Quite differently, the IS Undefined, due to its lack of long-term goals for IS and its inconsistent behavioral pattern regarding IS, would be least likely to have garnered the prior knowledge related to IS investments and built on this knowledge in organizational learning. Because of its reactive nature and its treatment of IS as an afterthought, the knowledge complementarity of the IS Undefined is likely to be low, thus bringing about an unrelated association between an undefined strategy and absorptive capacity (this alludes to H4c, which will be formally stated later in this section).

Other factors, related to an organization's prior knowledge, that can contribute to the development of absorptive capacity are the interrelated factors of knowledge scanning and experience. Knowledge scanning refers to organizational mechanisms that monitor the internal and external environments for the purpose of identifying and capturing relevant knowledge (Tu et al. 2006). Knowledge scanning can involve different activities, such as benchmarking, market tracking, and technology assessments (Tu et al. 2006), which all help a firm gain relevant experience (Zahra and George 2002). Experience can also be acquired from learning-by-doing methods that allow firms to develop new routines which in turn guide their future search for relevant knowledge. IT departments adopting innovative IS strategies are more likely to increase their absorptive capacity through knowledge scanning and experience than those adopting either a conservative strategy or having an undefined strategy. Research suggests that firms involved in research and development (R&D) activities, a learning-by-doing method, are likely to gain experience and acquire more related knowledge through scanning the

environment, which contributes to absorptive capacity (Cohen and Levinthal 1990). For example, Cohen and Levinthal's (1990) study of American manufacturing firms found that R&D efforts create a capacity for firms to assimilate and exploit new gained knowledge. R&D efforts are associated with innovation and facilitates learning (Cohen and Levinthal 1990) and since IS Innovator strategies more extensively engage in R&D than either conservative or undefined strategies, the IS Innovator would generate greater absorptive capacity than either of the other strategies (this again alludes to H4a). However, in keeping with its defined strategy, the IS Conservative also scans the environment seeking ways to increase its operational efficiency. This knowledge scanning and associated experience also increases the IS Conservative's absorptive capacity, albeit not to the extent as that of the IS Innovator (this again alludes to H4b). The IS Undefined, due to its nebulous approach to IS, does not consistently scan the environment nor is it likely to gain the necessary experience from continuous research and learning to develop absorptive capacity (this again alludes to H4c).

Thus, whether through prior related knowledge, environmental knowledge scanning, or experience, defined IS strategies will lead to the development of an IT department's absorptive capacity, with the relationship being stronger for the IS Innovator than the IS Conservative. Undefined IS strategies, on the other hand, will be unrelated to the development of absorptive capacity. Formally, the following are hypothesized:

H4a: IS Innovator strategy is positively associated with absorptive capacity.

H4b: IS Conservative strategy is positively associated with absorptive capacity, but this association is weaker than the association between IS Innovator and absorptive capacity.

H4c: IS Undefined strategy is unrelated to absorptive capacity.

IT Unit Agility

IT unit agility is defined as the IT department's ability to detect and garner the necessary resources to readily respond to environmental changes and market opportunities (Overby et al. 2006; Sambamurthy et al. 2003). IS can play an important role in directly and indirectly enabling both the detecting/sensing and responding components of agility (Overby et al. 2006). To illustrate, IS can directly relate to agility because firms need to have an adequate level of IS capability in order to detect technological advancements that are relevant to their business. For example, decades ago when some firms detected the market opportunities for the potential of interactive web pages and the secure socket layer protocol, they were able to reap the benefits by pioneering e-commerce strategies before competitors (Kalakota and Robinson 2001). Database systems that have the data mining capabilities to detect changes in customer preferences likewise illustrate the direct impact of IS on the sensing component of agility. The responding component of agility is also impacted by IS because firms rely on these technology systems to support their relationships with their customers and suppliers, especially in information technology driven industries, such as financial services, telecommunications, and hardware and software (Sambamurthy et al. 2003). Since changes in customer and supplier channels often require modifications and enhancements

to the systems that support the channels, IS also contributes to the unit's response component of agility. In addition to the direct effect IS can have on the unit's agility, IS can impact agility indirectly through the creation of digital options, which are "a set of IT-enabled capabilities in the form of digitized enterprise work processes and knowledge systems" (Sambamurthy et al. 2003, p. 247). Since information technologies strengthen work processes and knowledge systems (Alavi and Leidner 2001; Davenport 1993) by enhancing the breadth and richness of the firm's processes and knowledge (Sambamurthy et al. 2003), they improve the firm's ability to detect and respond to changes in the environment, thereby making the firm more agile (Overby et al. 2006).

Not only can information technologies enable agility as argued in prior research, but we postulate that a firm's IS strategy also has the potential to accentuate the development of the unit's agility depending on the approach the firm takes towards IS. Firms taking an innovative position to IS should expect greater agility than firms taking a more conservative or undefined approach. For the IS Innovator, R&D efforts are central to its explorative and experimental nature. Such efforts in practice should increase the firm's awareness and ability to sense technological and other changes in the environment because the firm is constantly probing for novel ways to leverage technology to gain competitive edge. As such, exploration and experimentation, in effect, cultivate the detection component of a department's agility. Furthermore, due to its constant R&D efforts, the IS Innovator should also experience an improvement in the response component of agility. R&D activities are learning-by-doing methods of explorative learning, which have been suggested in prior literature as ways to gain experience and acquire knowledge (Cohen and Levinthal 1990). This wide-ranging experience that is

gained by the firm provides the IS Innovator a multitude of ways from which to respond to environmental stimuli, thereby augmenting the firm's response agility. The general concept that R&D increases agility is confirmed in a study of 600 global manufacturing firms of durable goods (Ettlie 1998). The study found that R&D was significantly correlated with manufacturing agility, such that as R&D intensity increased, manufacturing agility also increased (Ettlie 1998).

Unlike that of the IS Innovator, the approach of the IS Conservative is less likely to lend itself to the development of agility. Because of its exploitative rather than explorative nature, the IS Conservative will likely have built systems of codified knowledge and routinized processes that increase the firm's operating efficiency, but it would not have gained the experience of "explorative" learning in pursuing innovative IS initiatives. Although codification and routinization can assist in maintaining stability for the IS Conservative, they can also cause rigidity, which runs counter to agility (Seo and La Paz 2008). Due to the narrow scope of exploitative learning and the rigidity caused by process codes and strict routines, the IS Conservative would experience a low ability to detect and respond to environmental changes. While the IS Conservative can manage change on its own timetable by developing absorptive capacity, it would be less able to manage change on the timetable of contingency occurrences. Thus, not only is it dubious that the IS Conservative develops agility, but it is more probable that the conservative approach thwarts the development of agility. The relationships between IS Innovative and IS Conservative strategies and agility are therefore hypothesized as follows:

H4d: IS Innovator strategy is positively associated with IT unit agility.

H4e: IS Conservative strategy is negatively associated with IT unit agility.

The IS Undefined is different from both the Innovator and Conservative in terms of its relationship with agility. Since its approach to IS is inconsistent, there may be certain periods of time when it attempts to be innovative and other periods when it resorts to being conservative. This inconsistency in learning and pursuing a strategy is likely to cause lapses in its ability to sense and respond to environmental changes. These lapses warrant the IS Undefined strategy and agility to be unrelated. Therefore, the relationship between IS Undefined and agility is hypothesized as:

H4f: IS Undefined strategy is unrelated to IT unit agility.

Impacts of IS Strategy through Dynamic Capabilities

The dynamic capabilities perspective postulates that dynamic capabilities, such as absorptive capacity and agility, will allow firms to build competitive advantage in turbulent environments (Cohen and Levinthal 1990; Overby et al. 2006; Sambamurthy et al. 2003; Teece et al. 1997). The past two decades have brought rapid changes in information technologies which have affected a wide range of industries, such as information services, financial institutions, communications, manufacturing, and software solutions. Since environmental change is increasingly driven by technological advancements and due to the pervasiveness of information technologies, firms that possess dynamic capabilities are more likely to gain competitive advantage within their industries than those without or with a low degree of such capabilities.

We further draw on the dynamic capabilities perspective to build our theory of IS strategy to explain the indirect impact of IS strategy on IS performance through the development of dynamic capabilities. IS performance is measured by the contribution that IS makes to the firm's overall performance. In the current study, we propose to link

IS strategy to IS performance through two dynamic capabilities (IT unit absorptive capacity and IT unit agility). Figure 3.7 illustrates the hypothesized relationships between the dynamic capabilities and IS performance, which are described next.

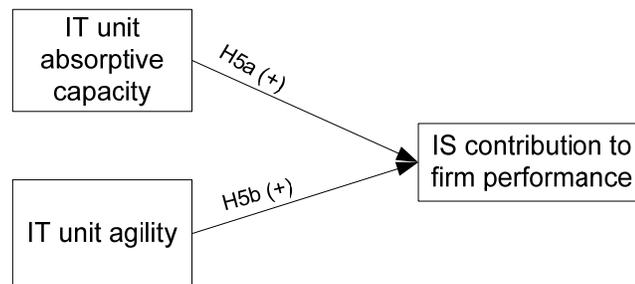


Figure 3.7. Relationships between Dynamic Capabilities and IS Contribution to Firm Performance

IS Contribution to Firm Performance

The resource-based view is a framework aimed at understanding how firms achieve and sustain competitive advantage in their markets (Barney 1991; Peteraf 1993; Wernerfelt 1984). The dynamic capabilities perspective, which extends the resource-based view for turbulent markets, also seeks to understand how firms can gain a competitive edge. Research suggests that organizations that develop dynamic capabilities are most likely to gain competitive advantage in rapidly changing environments. However, information technologies have pervaded every sector of industry and marketplace, creating fast-paced, highly competitive, and globalized competition (Baskerville 2006). Therefore, we posit that IT unit absorptive capacity and IT unit agility, both of which are dynamic capabilities, also will enable IS to contribute to the firm's gain in competitive positioning, almost notwithstanding industry sector.

As previously suggested, continuous pursuit of certain IS strategies can lead to the enhancement of the IT department's absorptive capacity, which contributes to its ability to innovate. This cycle of continuous improvement and innovation can potentially support the firm's achievement of sustained competitive impacts because the IT unit's absorptive capacity provides the firm with the degrees of freedom to adapt and evolve in its market environment (Zahra and George 2002). For example, in a study of 143 biopharmaceutical firms involved in strategic alliances, George, Zahra, Wheatley, and Khan (2001) found that absorptive capacity, along with certain characteristics of alliance portfolios, worked jointly to enhance the firms' financial performance. Similarly, a study of international joint ventures found that firms' ability to apply knowledge, a component of absorptive capacity, significantly increased firm performance in terms of increasing business volume, increasing market share, achieving planned goals, and making profits (Lane, Salk, and Lyles 2001). Likewise, we propose that the IT unit's absorptive capacity, generated from choice of its IS strategy, will be positively associated with IS contribution to the firm's performance.

H5a: IT unit absorptive capacity is positively associated with IS contribution to firm performance.

Like IT unit absorptive capacity, IT unit agility is also a significant determinant of firm success, especially as environmental conditions become increasingly unstable (Overby et al. 2006; Sambamurthy et al. 2003). Sambamurthy et al. (2003) have argued that agility is an important factor to effectuating a firm's competitive performance by continually enhancing and redefining the firm's value creation. Agility spawns a multitude of options in a firm's repertoire that it can take to respond to market

opportunities, which leads to competitive performance (Sambamurthy et al. 2003). For example, a study of 600 global manufacturing firms of durable goods showed that an increase in manufacturing agility was significantly and positively associated with market share increase (Ettlie 1998). Thus, it is subsequently hypothesized that:

H5b: IT unit agility is positively associated with IS contribution to firm performance.

CHAPTER FOUR

Method

To empirically examine our proposed theory of IS strategy, we conducted a survey-based study that was targeted to CIOs and other senior IT executives as primary respondents since these executives were thought to have the best overview of their IT departments' characteristics, strategy, capabilities, and performance. Following the precedence of prior studies of a similar nature (e.g. Bajjalay 1998; Braunscheidel and Suresh 2009; Carter 2011; He and Wong 2004; Leidner et al. 2011), survey responses from single respondents were deemed appropriate for this study. Suggestions for proper survey design (Trochim and Donnelly 2007) were taken into consideration during the design of the questionnaire. For example, to put respondents initially at ease, opening questions were made easy to answer. A transition statement was used each time the survey moved to a different topic or when questions used a different response scale. We were also cognizant not to ask particularly sensitive or specific questions about strategy. And the number of questions was kept limited so respondents would not tire before completing the survey. Furthermore, items in the survey were strategically placed so as to reduce response bias, especially for the dependent variables. For example, items measuring the dependent variables were placed near the beginning of the survey so that other question items would have fewer chances to "prime" respondents into selecting answers that would perhaps prejudice the responses to the dependent variables.

Two senior executives validated the survey instrument prior to the formal launch of the data collection—one was the CIO of a major corporation and the other was the

CEO of a small firm. Although CEOs were not the target respondents, it is believed that the CEO of a small firm would have fairly accurate knowledge of the firm's IS strategy and departmental operations and would be able to validate the question items on the survey. We also believe that two individuals would be sufficient to provide an appropriate face validation of the instrument since all items were adopted or adapted from prior literature (see measures section).

Data was collected using an online-based survey over the course of six weeks during the late summer to early fall of 2011 (please refer to Appendix A for the survey instrument). A total of 4346 emails were sent to CIOs and other senior IT executives of organizations in a variety of industries. The emails were sent in batches of approximately 150 to 300 per night so that they would reach the intended recipients during a weekday. Contact information for most public organizations and institutions were found through a search of online directories, for example, university system directories, state government directories, and the U.S. state CIO directory. The contact information for most private organizations was derived from several sources, for example, Dun & Bradstreet Million Dollar Database, Hoovers Database, and Lead411 Database. Of the total emails sent, 824 emails (18.96%) were returned as undeliverable and therefore 3522 emails were considered delivered to recipients. No bias was found in terms of company size for those recipients whose emails were delivered and those whose emails were undeliverable. A total of 289 survey responses were received for a response rate of 8.21% of the emails that were actually delivered. This response rate is not unusual for studies involving high level executives and the rate is consistent with previous studies targeting similar respondents in which the researchers have little or no special social, business, or

communications connections with the targeted respondents and thus in which response rates ranged from about 5% to 12% (e.g. Braunscheidel and Suresh 2009; Leidner et al. 2011; Pervan 1998; Preston et al. 2008).

Measures

All measures for this study were either adopted or adapted from prior literature. This section describes each construct and its measures and sources. All constructs were measured using multi-item scales (please refer to Appendix B).

Bureaucratic Culture

IT unit culture is measured on a nominal scale because it represents the degree to which the unit's culture is characterized by bureaucracy, innovativeness, and/or employee involvement. Culture, as Wallach (1983) suggests, may not fit exclusively into one category, but will fit to varying degrees in different categories. Bureaucratic cultures refer to hierarchically structured cultures with clearly defined lines of authority and responsibility based on control and power (Wallach 1983). To measure bureaucratic culture, respondents were asked to rate the extent to which each of the following items described how they viewed their IT department: 1) Hierarchical; 2) Procedural; 3) Cautious; 4) Power-oriented. These items were adopted from Wallach (1983) and used a 5-point response scale ranging from "no extent" to "very great extent".

Innovative Culture

Innovative cultures are dynamic and creative and the work places of such cultures have work that often involves challenge and risk (Wallach 1983). To measure innovative culture, respondents were asked to rate the extent to which each of the following items

described how they viewed their IT department: 1) Risk taking; 2) Results-oriented; 3) Creative; 4) Challenging. These items were adopted from Wallach (1983) and used a 5-point response scale ranging from “no extent” to “very great extent”.

Involvement Culture

Involvement cultures reflect a high level of participation and collaboration by organizational members in the firm’s decisions that affect them (Denison and Mishra 1995). To measure involvement culture, respondents were asked to rate the extent to which each of the following items described how they viewed their IT department: 1) Most people in the IT department have input into the decisions that affect them; 2) Cooperation and collaboration across functional roles is actively encouraged in our IT department; 3) Our IT department has an open door policy in which employees can seek the assistance and guidance of management above their immediate supervisor. These measures were adapted from Denison and Mishra (1995) and Surroca, Tribo, and Waddock (2010) and used a 5-point response scale ranging from “strongly disagree” to “strongly agree”.

Organizational Support for IT

Organizational support for IT is defined as the extent to which the organization provides the necessary resources and empowerment to support the IT department and IS initiatives (Jarvenpaa and Ives 1991; Preston et al. 2008). To measure organizational support for IT, respondents were asked to rate the extent to which they agreed or disagreed with each of the statements: 1) The IT department in our organization is well funded; 2) Our organization provides the necessary resources for strategic IT initiatives;

3) The organization ensures that IT initiatives receive the proper support to be successful. These measures were adopted from Preston et al. (2008) and used a 5-point response scale ranging from “strongly disagree” to “strongly agree”.

CIO Structural Power

CIO structural power refers to the power that is based on the formal structure and hierarchical authority of the CIO in the organization (Finkelstein 1992). To measure CIO structural power, the following questions were asked: 1) Is the CIO a formal member of your organization’s Top Management Team (TMT)?—with possible responses of Yes/No; 2) How many reporting levels are between the CIO and the CEO?—with possible responses of (a) 0 (the CIO reports directly to the CEO), (b) 1, (c) 2 or more. The responses will be used as formative measures, as described in the next chapter. These measures were adopted from Preston et al. (2008).

CIO Expert Power

CIO expert power results from the CIO’s ability to manage environmental contingencies and contribute to the organization’s success (Hambrick 1981; Mintzberg 1983; Tushman and Romanelli 1983). To measure CIO expert power, respondents were asked to rate the extent to which they agreed or disagreed with each of the following statements presented regarding their CIO or to assess themselves if they were the CIOs/highest ranking IT executives: 1) Our CIO is an effective strategic leader within the organization; 2) Our CIO is effective as a strategic business planner; 3) Our CIO is an effective visionary within the organization. These measures were adopted from Preston

et al. (2008) and used a 5-point response scale ranging from “strongly disagree” to “strongly agree”.

IS Innovator Strategy

An IS Innovator strategy is defined as an organizational view that continuously aspires to be innovative through new IS initiatives, i.e. this strategy seeks to explore new, uncertain alternatives. Respondents were asked to evaluate their organization’s general, long-term IS strategy. IS Innovator was measured using the following items: 1) Our IT department strives to be a leading IS innovator in our industry; 2) Our IT department seeks to explore new IS initiatives even if not all of these efforts prove to be highly profitable; 3) Our IT department responds rapidly to early signals concerning areas of opportunity for IS. These measures were adapted from Chen et al. (2010) and used a 5-point response scale ranging from “strongly disagree” to “strongly agree”.

IS Conservative Strategy

An IS Conservative strategy represents an organizational perspective that strives to create value by gaining efficiency through effectively refining and improving existing IS practices and technologies, i.e. this strategy seeks to exploit existing organizational resources. Respondents were asked to evaluate their organization’s general, long-term IS strategy. IS Conservative was measured using the following items: 1) Our IT department mainly seeks to gain efficiency by refining existing IS practices and technologies; 2) Our IT department adopts promising IS innovations once these initiatives have been proven in our industry; 3) IS innovations are carefully examined before they are chosen by our IT department. These measures were adapted from Chen et al. (2010), although the first

item was reworded. The measures used a 5-point response scale ranging from “strongly disagree” to “strongly agree”.

IS Undefined Strategy

An IS Undefined strategy is one that does not have an articulated approach or long-term goals for the firm to either explore or exploit the use of IS for strategic purposes. Respondents were asked to evaluate their organization’s general, long-term IS strategy. IS Undefined was measured using the following items: 1) Our IT department does not have definitive long-term IS goals; 2) Our IT department does not have an articulated IS strategy; 3) Our IT department does not have a consistent pattern of behavior regarding IS. These measures were adapted from Chen et al. (2010) and used a 5-point response scale ranging from “strongly disagree” to “strongly agree”.

IT Unit Absorptive Capacity

IT unit absorptive capacity is defined as the IT department’s ability to acquire information, assimilate it, and apply the new gained knowledge to produce an organizational capability that can effectively respond to dynamic environments (Cohen and Levinthal 1990; Tu, Vonderembse, Ragu-Nathan, and Sharkey 2006; Zahra and George 2002). To measure IT unit absorptive capacity, respondents were asked to rate the extent to which each of the following statements described their IT department: 1) Our IT department is able to identify and acquire internal (e.g. within the department) and external (e.g. market) knowledge; 2) We are effective in developing new knowledge or insights that have the potential to influence product development; 3) We have effective routines to identify, value, and assimilate new information and knowledge; 4) We are

effective in transforming existing information into new knowledge; 5) We can successfully exploit internal and external information and knowledge into concrete applications. These measures were adapted from Pavlou and El Sawy (2006) and used a 5-point response scale ranging from “no extent” to “very great extent”.

IT Unit Agility

IT unit agility is defined as the IT department’s ability to detect and garner the necessary resources to readily respond to environmental changes and market opportunities relating to IS (Overby et al. 2006; Sambamurthy et al. 2003). To measure IT unit agility, respondents were asked to rate the extent to which their IT department is able to do each of the following: 1) Quickly detect changes in customer demand; 2) Swiftly detect advances in technology that are relevant to the business; 3) Rapidly respond to advances in technology that are relevant to the business; 4) Promptly adjust to economic shifts that have the potential to impact the department. The items were adapted from Tallon (2008) and adjusted to fit the context of this study based on the guidance of Overby et al.’s (2006) definition and description of agility. The items used a 5-point response scale ranging from “no extent” to “very great extent”.

IS Contribution to Firm Performance

IS contribution to firm performance refers to the extent to which the IT department has contributed to the organization’s performance (Preston et al. 2008). To measure IS contribution to firm performance, respondents were asked to assess the extent to which IT has contributed to their organization in each of the following areas: 1) Return on investment; 2) Sales revenue increase; 3) Market share increase; 4) Cost savings; 5)

Operating efficiency; 6) Process improvement; 7) Customer satisfaction. These items were adopted from Preston et al. (2008) and used a 5-point response scale ranging from “no extent” to “very great extent”.

All variables were modeled as reflective constructs, except for CIO structural power, which was modeled as a formative construct following Preston et al. (2008). Formative constructs normally meet the following conditions: 1) changes in the formative measures cause changes in the underlying construct such that the combination of the measures defines the construct, 2) there is no reason to expect the measures to be highly correlated, and 3) dropping an indicator from the measurement model may alter the meaning of the construct (Jarvis, Mackenzie, and Podsakoff 2003; Petter, Straub, and Rai 2007). The measurement items for this study are summarized in Appendix B.

CHAPTER FIVE

Analysis and Results

Participant and Organization Characteristics

Respondents included Chief Information Officers, Chief Technology Officers, Vice Presidents of Technology, IT Directors, and other senior IT executives. In fact, 82% of respondents identified themselves as the highest ranking IT executive in their organizations and therefore this sample provides an excellent representation of the target respondents for the study. On average, respondents had been in their current positions for 6 years and with their organizations for almost 10 years. The organizations represented in the sample are heterogeneous in size and industry, as can be seen in Table 5.1. The majority of the organizations fall into 5 main industries—manufacturing, colleges and universities, medical and health services, financial services, and wholesale/retail trade and distribution—and these comprise 64.6% (175 total) of the sample. In terms of size, organizations employed 100 or fewer employees to more than 100,000 employees, with approximately one-fourth of the organizations having between 1001 to 5000 employees. Although most IT departments represented were comprised of 50 or fewer employees, 8.5% had more than 1000 IT employees. And IT budgets ranged from less than one million dollars to more than half a billion. Table 5.1 offers the details of both participant and organization characteristics.

Table 5.1. Sample Characteristics

| Participant Characteristics | | Organization Characteristics | | |
|--------------------------------------|-------------------|---|--------------|-------------------|
| | | | <u>Count</u> | <u>Percentage</u> |
| <i>Highest ranking IT executive?</i> | | <i>Industry</i> | | |
| Yes | 222 (81.9%) | Manufacturing | 49 | 18.1% |
| No | 49 (18.1%) | Colleges & universities | 42 | 15.5% |
| <i>Job tenure</i> | | Medical & health services | 30 | 11.1% |
| Mean | 5.9 years | Financial services | 28 | 10.3% |
| Median | 4.4 years | Wholesale/retail trade and distribution | 26 | 9.6% |
| Min | Less than 1 month | Consulting | 17 | 6.3% |
| Max | 27 years | Government | 17 | 6.3% |
| <i>Organization tenure</i> | | Software publisher | 13 | 4.8% |
| Mean | 9.6 years | Publishing/media | 10 | 3.7% |
| Median | 6.7 years | Service providers (web, utility) | 9 | 3.3% |
| Min | 1 month | Construction | 8 | 3.0% |
| Max | 40 years | Transportation/storage | 7 | 2.6% |
| | | Telecommunications | 5 | 1.8% |
| | | Research | 3 | 1.1% |
| | | Other non-profit | 2 | 0.7% |
| | | No response | 5 | 1.8% |
| | | <i>Headquarter region</i> | | |
| | | North America | 262 | 96.7% |
| | | Asia | 3 | 1.1% |
| | | Europe | 4 | 1.5% |
| | | Other | 2 | 0.7% |
| | | <i>Organization size (number of employees)</i> | | |
| | | 1-100 | 14 | 5.2% |
| | | 101-500 | 54 | 19.9% |
| | | 501-1000 | 38 | 14.0% |
| | | 1001-5000 | 67 | 24.7% |
| | | 5001-10,000 | 31 | 11.4% |
| | | 10,001-50,000 | 42 | 15.5% |
| | | 50,001-100,000 | 12 | 4.4% |
| | | More than 100,000 | 11 | 4.1% |
| | | No response | 2 | 0.7% |
| | | <i>IT department size (number of employees)</i> | | |
| | | 1-50 | 124 | 45.8% |
| | | 51-100 | 33 | 12.2% |
| | | 101-500 | 75 | 27.7% |
| | | 501-1000 | 13 | 4.8% |
| | | More than 1000 | 23 | 8.5% |
| | | No response | 3 | 1.1% |

Table 5.1. Sample Characteristics (cont'd)

| Participant Characteristics | Organization Characteristics | |
|--|------------------------------|-------------------|
| | <u>Count</u> | <u>Percentage</u> |
| <i>Approximate annual IT budget</i> | | |
| Less than \$1 million | 37 | 13.7% |
| More than \$1 million to \$5 million | 64 | 23.6% |
| More than \$5 million to \$10 million | 36 | 13.3% |
| More than \$10 million to \$50 million | 58 | 21.4% |
| More than \$50 million to \$100 million | 30 | 11.1% |
| More than \$100 million to \$500 million | 15 | 5.5% |
| More than \$500 million | 18 | 6.6% |
| Don't know | 10 | 3.7% |
| No response | 3 | 1.1% |

Choice of a Multivariate Analysis Technique

We choose the partial least squares (PLS) approach to analyze the proposed research model. PLS is the chosen technique for this particular study because it focuses on maximizing explained variance, that is, prediction of the constructs (Hair, Black, Babin, and Anderson 2009), which is consistent with the objectives of this study to explore how well the antecedent variables can explain the dependent variables. In addition, PLS is a suitable choice when testing models that contain both formative and reflective measures. Although in general, PLS is robust in the face of missing values and the usual violations to statistical assumptions for modeling latent variables (Garson 2011), we were nonetheless prudent in following Hair et al.'s (2006) recommendations for preparing data for multivariate analysis. The next section discusses the examination and preparation of the data for PLS analysis.

Examining and Preparing Data for Multivariate Analysis

In preparing the data for analysis, we examined the data set for (a) missing data, (b) outliers, and (c) meeting the assumptions for multivariate analysis. To assess missing

data, we examined each response to determine the extent and randomness of the missing values. As a rule-of-thumb for handling missing data, it is recommended that individual cases with more than 10 to 20% missing data may be deleted provided that the number of cases remaining is sufficient for the chosen data analysis technique (Hair, Black, Babin, Anderson, and Tatham 2006). Since the current sample size is sufficiently large, observations with more than 20% missing data or responses that showed obvious attrition at the end of the survey (nonrandom missing data) were deleted. As a result, 18 observations were removed. It is also recommended that cases with missing data for dependent variables be deleted to avoid artificially inflating relationships (Hair et al. 2006). However, in this particular sample, no observations needed to be removed since no missing data was observed for the dependent or intermediate variables, i.e. the IS strategies, absorptive capacity, agility, and contribution to firm performance. For cases with less than 10% missing data, missing values were determined to be missing at random (respondents perhaps overlooked some question items) and thus the mean substitution imputation method will be used to replace missing values during the PLS analysis. A total of 271 cases remained after cleaning missing data.

To assess outliers, the remaining cases were tested by converting data values to standard scores using the formula $z_i = (x_i - m) / sd$, where x_i = a value in the data set; m = the mean of the data set for a particular variable; and sd = standard deviation of the data set for a particular variable. For large sample sizes (e.g. more than 80 observations), the suggested rule-of-thumb is that a value is considered an outlier if its standard score is 4 or more standard deviations from the mean (Hair et al. 2006). Some cases contained mild outliers; however, Hair et al. (2006) suggest that outlier cases should be retained unless it

can be demonstrated that outliers are truly aberrant and not at all representative of the population. Outliers in the current data were determined to be valid and therefore all cases with outliers were retained.

To evaluate whether the data meet the assumptions for multivariate analysis, we tested the assumptions of normality, homoscedasticity, linearity, and independence of the error terms. First, normality was tested statistically by calculating the z values for both skewness and kurtosis following Hair et al. (2006, p. 81) for each variable. It was also assessed using the Shapiro-Wilk's and Kolmogorov-Smirnov tests. Both tests reveal that some variables significantly departed from the normal distribution; however, as a rule-of-thumb, the effect of departures from normality effectively diminishes when sample sizes approach 200 or more cases (Hair et al. 2006). Because the current sample size is 271 and PLS is robust to the usual violations of statistical assumptions, no actions were necessary to remedy the situation of non-normality. Second, homoscedasticity was assessed using Levene's test. Except for the observation that several variables had heterogeneity of variance (perhaps due to the non-normality of some of the variables formerly mentioned), overall, the variance of the dependent variables appears to be equal across the range of predictor variables, meaning the relationships meet the assumption of homoscedasticity. Third, linearity was assessed using the ANOVA test of linearity as recommended by Garson (2011). Significant deviations for linearity were not observed for the relationships. Fourth, independence of observations was tested using the Durbin-Watson coefficient. The Durbin-Watson statistic should fall between 1.5 and 2.5 for independent observations (Garson 2011)—the statistics for the current sample were within this range.

In addition to examining missing data, outliers, and statistical assumptions, we also ran initial factor analyses in SPSS in order to evaluate the variables independent of any research model. Because construct items were either adopted or adapted from extant literature, the items should, for the most part, exhibit favorable loadings in terms of construct validity. Except for some cross-loadings, the loadings overall appeared valid in this initial assessment. Construct validity will be analyzed more fully using PLS in the next section.

Data Validations and Study Results

Along with providing descriptive statistics, this section offers details of the data validations, research model results, mediation tests, and any post-hoc analyses for the study.

Descriptive Statistics

Table 5.2 provides descriptive statistics for the constructs examined in this study.

Table 5.2. Descriptive Statistics

| Construct | Min | Max | Mean | Std Dev |
|-------------------------------------|------|-----|------|---------|
| Bureaucratic culture | 1 | 5 | 3.12 | 0.78 |
| Innovative culture | 1.25 | 5 | 3.53 | 0.65 |
| Involvement culture | 2 | 5 | 4.23 | 0.59 |
| Organizational support for IT | 1 | 5 | 3.42 | 0.94 |
| CIO structural power (report level) | 0 | 2 | 0.55 | 0.59 |
| CIO expert power | 1 | 5 | 4.03 | 0.74 |
| IS Innovator | 1 | 5 | 3.63 | 0.77 |
| IS Conservative | 2 | 5 | 4.16 | 0.70 |
| IS Undefined | 1.33 | 5 | 2.00 | 0.85 |
| IT unit ACAP | 1 | 5 | 3.48 | 0.77 |
| IT unit agility | 1 | 5 | 3.35 | 0.82 |
| IS contribution to firm performance | 1.57 | 5 | 3.62 | 0.68 |

Data Validations

The data was validated in two steps prior to testing the structural PLS model. Control variables were first tested, then the PLS measurement model was validated following commonly accepted procedures; both are discussed in the proceeding subsections.

Control variables. Prior to analyzing the research model, the following were tested, using PLS, as control variables to determine whether any were significant predictors of the dependent variable, IT contribution to firm performance: job tenure, organization tenure, industry, organization size, IT department size, and annual IT budget. None of these variables were found to be significant predictors of performance.

PLS measurement model. The research model was analyzed using SmartPLS software (Ringle, Wende, and Will 2005) following the approach outlined by Chin (1998). As previously noted, the research model consists of a combination of reflective as well as formative measures (the measure for CIO structural power is formative while all other measures are reflective) and hence measurement validation should be assessed for each measurement type. For reflective measures, reliability and convergent validity were confirmed in two ways. First, all composite reliability (CR) measures were greater than .70, which provides support for acceptable internal consistency (Chin, 1998). Second, the average variance extracted (AVE) for each factor was greater than .50, indicating acceptable reliability and convergent validity (Chin 1998; Fornell and Larcker 1981). Table 5.3 lists the CRs and AVEs for each factor. Discriminant validity for reflective measures was also assessed in two ways. First, as illustrated in Table 5.4, the square root of the AVE for each factor was higher than the correlations with other factors,

indicating that each factor shares higher variance with items in its own factor than with items in other factors (Chin 1998). Second, as shown in Table 5.5, the cross-loadings indicate that each item loads higher on its own construct than on other constructs (Chin 1998).

In the process of achieving satisfactory reliability and validity, four items with loadings of less than 0.60 were dropped from the measurement model. These included two items measuring bureaucratic culture and two items measuring IS Conservative. The dropped items are noted in Appendix B at the end of the construct items to which they correspond.

Table 5.3. Measurement Validations for Reflective Measures

| Construct | AVE | CR |
|--------------------------------|-------|-------|
| Bureaucratic culture | 0.643 | 0.782 |
| CIO expert power | 0.802 | 0.924 |
| IS Conservative | 1.000 | 1.000 |
| IS Innovator | 0.599 | 0.814 |
| IS Undefined | 0.725 | 0.887 |
| IS contribution to performance | 0.505 | 0.877 |
| IT unit ACAP | 0.655 | 0.905 |
| IT unit agility | 0.645 | 0.879 |
| Innovative culture | 0.510 | 0.804 |
| Involvement culture | 0.660 | 0.854 |
| Org support for IT | 0.794 | 0.920 |

Table 5.4. Additional Validations and Correlations for Reflective Measures

| Construct | Bureau culture | CIO expert power | IS Conserv | IS Innov | IS Undef | IT contrib to perf | IT unit ACAP | IT unit agility | Innov culture | Involve culture | Org support for IT |
|----------------------|----------------|------------------|------------|----------|----------|--------------------|--------------|-----------------|---------------|-----------------|--------------------|
| Bureaucratic culture | 0.802 | | | | | | | | | | |
| CIO expert power | -0.183 | 0.896 | | | | | | | | | |
| IS Conservative | 0.116 | 0.094 | 1.000 | | | | | | | | |
| IS Innovator | -0.108 | 0.428 | 0.073 | 0.774 | | | | | | | |
| IS Undefined | 0.058 | -0.443 | -0.156 | -0.398 | 0.851 | | | | | | |
| IT contrib to perf | -0.053 | 0.492 | 0.132 | 0.389 | -0.412 | 0.710 | | | | | |
| IT unit ACAP | -0.127 | 0.479 | 0.131 | 0.500 | -0.442 | 0.621 | 0.809 | | | | |
| IT unit agility | -0.119 | 0.542 | 0.101 | 0.502 | -0.340 | 0.634 | 0.638 | 0.803 | | | |
| Innovative culture | -0.145 | 0.473 | 0.064 | 0.482 | -0.410 | 0.503 | 0.554 | 0.574 | 0.714 | | |
| Involvement culture | -0.187 | 0.499 | 0.202 | 0.238 | -0.383 | 0.385 | 0.431 | 0.385 | 0.403 | 0.813 | |
| Org support for IT | -0.086 | 0.254 | 0.073 | 0.359 | -0.326 | 0.266 | 0.403 | 0.362 | 0.266 | 0.148 | 0.891 |

Note: The diagonal shaded cells are the square roots of the average variance extracted (AVE) for each factor.

Table 5.5. Loadings and Cross Loadings for Reflective Measures

| Item | Bureau culture | CIO expert power | IS Conserv | IS Innov | IS Undef | IT contrib to perf | IT unit ACAP | IT unit agility | Innov culture | Involve culture | Org support for IT |
|------------------|----------------|------------------|------------|----------|----------|--------------------|--------------|-----------------|---------------|-----------------|--------------------|
| ACAP_1 | -0.103 | 0.426 | 0.122 | 0.405 | -0.381 | 0.512 | 0.773 | 0.514 | 0.451 | 0.396 | 0.420 |
| ACAP_2 | -0.164 | 0.404 | 0.084 | 0.416 | -0.314 | 0.492 | 0.783 | 0.531 | 0.483 | 0.322 | 0.265 |
| ACAP_3 | -0.030 | 0.330 | 0.099 | 0.426 | -0.406 | 0.501 | 0.830 | 0.472 | 0.450 | 0.336 | 0.305 |
| ACAP_4 | -0.091 | 0.349 | 0.094 | 0.387 | -0.318 | 0.496 | 0.819 | 0.490 | 0.414 | 0.313 | 0.292 |
| ACAP_5 | -0.131 | 0.428 | 0.128 | 0.388 | -0.365 | 0.511 | 0.839 | 0.575 | 0.441 | 0.373 | 0.343 |
| Agility_1 | -0.066 | 0.413 | 0.119 | 0.358 | -0.294 | 0.545 | 0.481 | 0.757 | 0.430 | 0.335 | 0.270 |
| Agility_2 | -0.130 | 0.458 | 0.086 | 0.460 | -0.308 | 0.516 | 0.552 | 0.845 | 0.489 | 0.300 | 0.329 |
| Agility_3 | -0.074 | 0.460 | 0.076 | 0.486 | -0.284 | 0.538 | 0.573 | 0.858 | 0.532 | 0.294 | 0.340 |
| Agility_4 | -0.121 | 0.406 | 0.032 | 0.277 | -0.188 | 0.425 | 0.425 | 0.747 | 0.375 | 0.317 | 0.203 |
| CIOExPwr_1 | -0.137 | 0.918 | 0.073 | 0.425 | -0.425 | 0.461 | 0.465 | 0.511 | 0.474 | 0.415 | 0.276 |
| CIOExPwr_2 | -0.151 | 0.897 | 0.080 | 0.314 | -0.378 | 0.437 | 0.372 | 0.472 | 0.361 | 0.456 | 0.227 |
| CIOExPwr_3 | -0.208 | 0.872 | 0.102 | 0.407 | -0.384 | 0.424 | 0.446 | 0.470 | 0.429 | 0.475 | 0.175 |
| CultureBureau_2 | 0.849 | -0.086 | 0.102 | 0.001 | -0.066 | 0.023 | -0.004 | -0.018 | 0.012 | -0.102 | -0.061 |
| CultureBureau_3 | 0.753 | -0.224 | 0.082 | -0.197 | 0.187 | -0.124 | -0.225 | -0.193 | -0.276 | -0.212 | -0.080 |
| CultureInnov_1 | -0.170 | 0.256 | -0.064 | 0.377 | -0.178 | 0.255 | 0.311 | 0.421 | 0.671 | 0.172 | 0.117 |
| CultureInnov_2 | -0.023 | 0.343 | 0.188 | 0.215 | -0.369 | 0.410 | 0.388 | 0.376 | 0.635 | 0.342 | 0.270 |
| CultureInnov_3 | -0.099 | 0.474 | 0.076 | 0.442 | -0.384 | 0.455 | 0.532 | 0.506 | 0.855 | 0.375 | 0.219 |
| CultureInnov_4 | -0.091 | 0.258 | 0.042 | 0.274 | -0.271 | 0.341 | 0.334 | 0.308 | 0.676 | 0.289 | 0.199 |
| CultureInvolve_1 | -0.124 | 0.387 | 0.193 | 0.182 | -0.274 | 0.274 | 0.371 | 0.286 | 0.284 | 0.785 | 0.048 |
| CultureInvolve_2 | -0.127 | 0.439 | 0.177 | 0.183 | -0.356 | 0.331 | 0.339 | 0.354 | 0.337 | 0.854 | 0.171 |
| CultureInvolve_3 | -0.209 | 0.389 | 0.120 | 0.216 | -0.298 | 0.333 | 0.344 | 0.295 | 0.361 | 0.797 | 0.135 |
| ISConserv_3 | 0.116 | 0.094 | 1.000 | 0.073 | -0.156 | 0.132 | 0.131 | 0.101 | 0.064 | 0.202 | 0.073 |
| ISInnov_1 | -0.048 | 0.359 | 0.033 | 0.822 | -0.308 | 0.285 | 0.330 | 0.377 | 0.429 | 0.102 | 0.264 |
| ISInnov_2 | -0.032 | 0.112 | 0.018 | 0.604 | -0.132 | 0.064 | 0.211 | 0.226 | 0.162 | 0.032 | 0.227 |
| ISInnov_3 | -0.140 | 0.429 | 0.095 | 0.870 | -0.407 | 0.436 | 0.535 | 0.496 | 0.449 | 0.324 | 0.331 |

Table 5.5. Loadings and Cross Loadings for Reflective Measures (cont'd)

| Item | Bureau culture | CIO expert power | IS Conserv | IS Innov | IS_UNDEF | IT contrib to perf | IT unit ACAP | IT unit agility | Innov culture | Involve culture | Org support for IT |
|--------------|----------------|------------------|------------|----------|----------|--------------------|--------------|-----------------|---------------|-----------------|--------------------|
| ISPerf_1 | -0.031 | 0.364 | 0.141 | 0.286 | -0.325 | 0.779 | 0.448 | 0.509 | 0.373 | 0.307 | 0.175 |
| ISPerf_2 | -0.012 | 0.314 | 0.019 | 0.279 | -0.321 | 0.720 | 0.443 | 0.418 | 0.364 | 0.193 | 0.254 |
| ISPerf_3 | -0.035 | 0.334 | 0.068 | 0.287 | -0.257 | 0.741 | 0.469 | 0.470 | 0.370 | 0.228 | 0.213 |
| ISPerf_4 | -0.105 | 0.304 | 0.098 | 0.251 | -0.285 | 0.673 | 0.415 | 0.440 | 0.303 | 0.169 | 0.096 |
| ISPerf_5 | -0.056 | 0.389 | 0.187 | 0.199 | -0.251 | 0.674 | 0.398 | 0.385 | 0.323 | 0.370 | 0.157 |
| ISPerf_6 | -0.094 | 0.398 | 0.078 | 0.286 | -0.294 | 0.683 | 0.440 | 0.382 | 0.364 | 0.343 | 0.171 |
| ISPerf_7 | 0.049 | 0.353 | 0.076 | 0.331 | -0.310 | 0.698 | 0.470 | 0.526 | 0.394 | 0.314 | 0.244 |
| ISUndef_1 | 0.028 | -0.399 | -0.134 | -0.310 | 0.873 | -0.345 | -0.357 | -0.257 | -0.337 | -0.314 | -0.291 |
| ISUndef_2 | 0.040 | -0.412 | -0.106 | -0.342 | 0.894 | -0.322 | -0.343 | -0.272 | -0.339 | -0.337 | -0.256 |
| ISUndef_3 | 0.077 | -0.320 | -0.155 | -0.360 | 0.783 | -0.379 | -0.422 | -0.333 | -0.366 | -0.324 | -0.281 |
| OrgSupport_1 | -0.108 | 0.200 | 0.030 | 0.327 | -0.255 | 0.152 | 0.320 | 0.298 | 0.160 | 0.108 | 0.878 |
| OrgSupport_2 | -0.095 | 0.207 | 0.077 | 0.232 | -0.254 | 0.207 | 0.319 | 0.310 | 0.196 | 0.119 | 0.890 |
| OrgSupport_3 | -0.040 | 0.261 | 0.087 | 0.375 | -0.343 | 0.326 | 0.418 | 0.353 | 0.328 | 0.160 | 0.905 |

Reliability and validity are not assessed for formative measures as they are for reflective measures; rather, formative measures are assigned beta weights as in a regression formula (Chwelos, Benbasat, and Dexter 2001; Coltman, Devinney, Midgley, and Venaik 2008; Petter et al. 2007). The weights for each item will demonstrate the item's contribution to the construct. While some researchers suggest removing items whose weights are non-significant (Diamantopoulos and Winklhofer 2001), others advocate retaining non-significant indicators to preserve content validity (Bollen and Lennox 1991). The weights of the two items measuring CIO structural power are provided in Table 5.6. The weight for the first item (CIO report level) is statistically non-significant; however, following Bollen and Lennox (1991), we retained both items measuring CIO structural power. The second item (CIO TMT membership) is statistically significant and contributed the most to the construct (weight=0.9914).

Table 5.6. Weights for Formative Measures

| Items in CIO structural power | Weight |
|---------------------------------------|----------|
| CIO structural power (report level) | 0.5244 |
| CIO structural power (TMT membership) | 0.9914** |

Note: ** significant at .01

Results: PLS Structural Model

The standard bootstrap resampling procedure¹ was used to test the significance of the structural research model. Figure 5.1 illustrates the overall model results from the structural analysis, with explanatory powers (R^2) and standardized path coefficients (β).

¹ The standard bootstrap resampling procedure (Yung and Bentler 1996) involves estimating the significance of the paths of a model by evaluating a number of resamples of the dataset. Each sample in the resampling is obtained by randomly sampling the original dataset with replacement. In SmartPLS, the number of samples for standard bootstrapping is set to 500, which should provide appropriately stable results (Temme, Kreis, and Hildebrandt 2010).

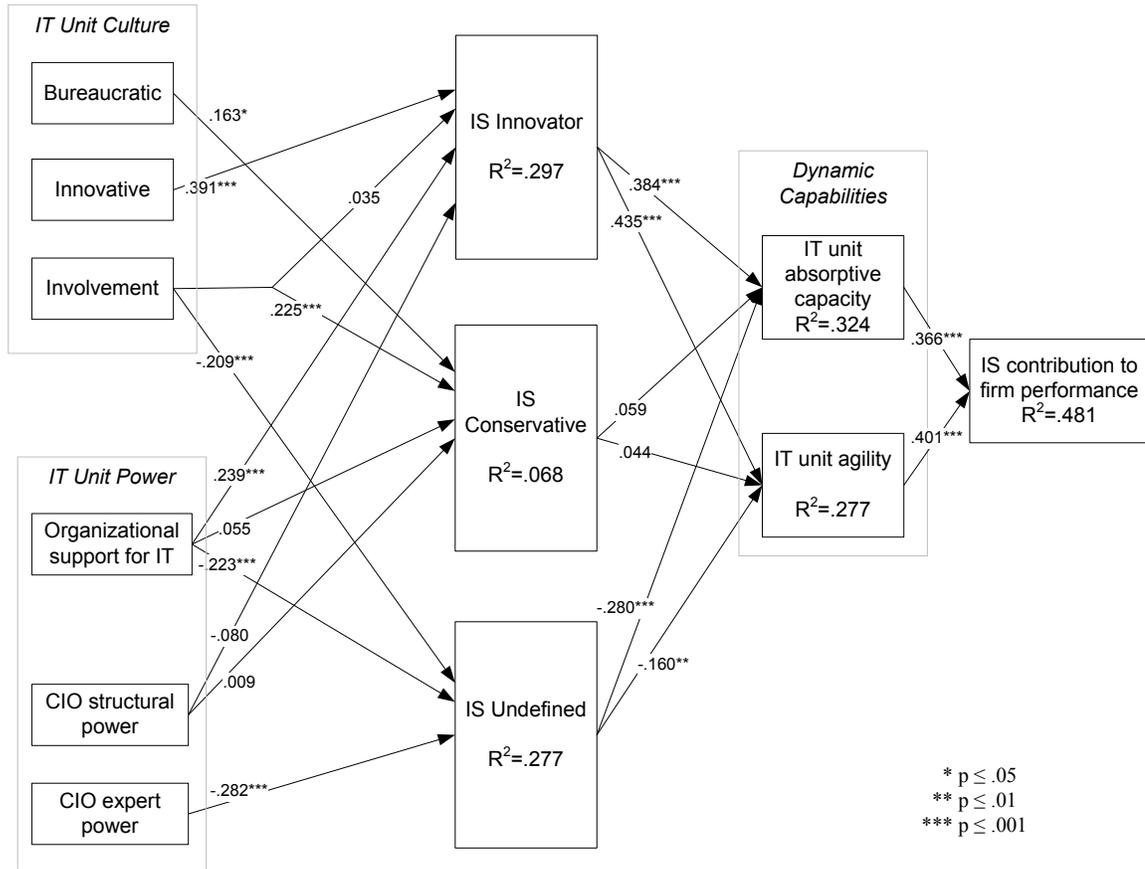


Figure 5.1. Overall Model Results

The results show that 10 of the hypotheses were supported being significant at the .05 level or better and one hypothesis received partial support. Significant negative relationships—rather than no relationships, as hypothesized—were found for H4c (stated as: IS Undefined strategy is unrelated to absorptive capacity) and H4f (stated as: IS Undefined strategy is unrelated to agility). The antecedents together explained 29.7% of the variance for IS Innovator, 27.7% of the variance for IS Undefined, and only 6.8% of the variance for IS Conservative. The IS strategies together explained 32.4% of the variance for absorptive capacity and 27.7% of the variance for agility. And the two

dynamic capabilities explained 48.1% of the variance for IS contribution to performance.

Table 5.7 summarizes the hypotheses results.

Table 5.7. Summary of Hypotheses Results

| Hypothesis | Result |
|--|-----------------------------|
| H1a: Bureaucratic cultures are positively associated with IS Conservative strategies. | Supported |
| H1b: Innovative cultures are positively associated with IS Innovator strategies. | Supported |
| H1c: Involvement cultures are positively associated with defined IS strategies. | Partial support (see below) |
| i) Involvement cultures are positively associated with IS Innovator strategies. | Not Supported |
| ii) Involvement cultures are positively associated with IS Conservative strategies. | Supported |
| H1d: Involvement cultures are negatively associated with undefined IS strategies. | Supported |
| H2a: Organizational support for IT is positively associated with IS Innovator strategies. | Supported |
| H2b: Organizational support for IT is negatively associated with IS Conservative strategies. | Not Supported |
| H2c: Organizational support for IT is negatively associated with IS Undefined strategies. | Supported |
| H3a: CIO structural power is positively associated with IS Innovator strategies. | Not supported |
| H3b: CIO structural power is negatively associated with IS Conservative strategies. | Not supported |
| H3c: CIO expert power is negatively associated with IS Undefined strategies. | Supported |
| H4a: IS Innovator strategy is positively associated with absorptive capacity. | Supported |
| H4b: IS Conservative strategy is positively associated with absorptive capacity, but this association is weaker than the association between IS Innovator and absorptive capacity. | Not supported |
| H4c: IS Undefined strategy is unrelated to absorptive capacity. | Negative relationship found |
| H4d: IS Innovator strategy is positively associated with agility. | Supported |
| H4e: IS Conservative strategy is negatively associated with agility. | Not supported |
| H4f: IS Undefined strategy is unrelated to agility. | Negative relationship found |
| H5a: IT unit absorptive capacity is positively associated with IS contribution to firm performance. | Supported |
| H5b: IT unit agility is positively associated with IS contribution to firm performance. | Supported |

Mediation Tests

Two sets of mediation tests were conducted—one to determine whether the IS strategies were mediators between the antecedents and dynamic capabilities (we will refer to this as Test Set 1), and the other to determine whether the dynamic capabilities

were mediators between the IS strategies and IS contribution to firm performance (we will refer to this as Test Set 2). For Test Set 1, 22 mediation tests were conducted—one for each mediating relationship in the research model between the antecedents and dynamic capabilities. For example, two mediation tests would be needed to assess the indirect effect of bureaucratic culture: one test is needed to assess the relationship “bureaucratic culture → IS Conservative → absorptive capacity”, and another is needed to assess the relationship “bureaucratic culture → IS Conservative → agility”, and so on. For Test Set 2, 6 mediation tests were conducted—one for each mediating relationship in the model between the IS strategies and IS contribution to performance.

To establish mediation, the indirect effect of the independent variable (e.g. bureaucratic culture) to the outcome variable (e.g. agility) must be significant (Helm, Eggert, and Garnefeld, 2010). Independent PLS models were run as needed for the two test sets aforementioned and Sobel (1982) test calculations were applied. The resulting Sobel z-statistics were then assessed using the standard $p \leq .05$ criteria to determine the significance of the mediation. Tables 5.8 and 5.9 provide the results of the mediation tests. For Test Set 1, partial mediation through the IS strategies was found for 12 of the 22 indirect relationships between the antecedents and dynamic capabilities. However, no mediation was found for 10 of the 22 indirect relationships. For Test Set 2, full mediation through the dynamic capabilities was found for 3 of the 6 indirect relationships between the IS strategies and performance. Two of the 6 indirect relationships were found to be partially mediated and no mediation was found for one of the indirect relationships, although the Sobel p-value was .063. The magnitude of each mediated relationship can be estimated by calculating the VAF (Variance Accounted For), that is,

the ratio of the indirect effect to the total effect (see Helm et al., 2010). The VAFs are also provided in Tables 5.8 and 5.9. As shown, the VAFs are especially large for the indirect effects of the IS strategies on performance, mediated through dynamic capabilities (refer to Table 5.9). For example, approximately 94% of the total effect of the IS Innovator strategy on performance is explained by its indirect effect through either absorptive capacity or agility. Even the partial mediation of absorptive capacity and agility explain nearly 50% of the total effect of the IS Undefined strategy on performance. This lends support to our contention that IS strategies themselves may not necessarily directly lead to performance, but rather performance is achieved through the development of dynamic capabilities by the consistent pursuit of IS strategies.

Post-Hoc Analyses

To further confirm the overall validity of the model of IS strategy, we analyzed only those organizations that have implemented the same strategy, or lack thereof in the case of IS Undefined, for more than two years (n=153) and then more than three years (n=92) and results either predominantly remained stable or more so supported the original hypotheses. For example, analyzing organizations whose IS strategies remained stable for the past three years yielded a significantly positive relationship between IS Conservative and absorptive capacity, thereby supporting H4b ($\beta = .171$; $p < .004$). But since executing to the same IS strategy for two years should be ample time to produce results, we show the results of the model analysis of those organizations that have implemented the same strategy for two or more years (n=153). Figure 5.2 illustrates the model results from the structural analysis of these organizations.

Table 5.8. Mediation Test Results for Test Set 1 (i.e. IS Strategies as Mediators)

| Mediating Relationship | Sobel z-Statistic | Sobel p Value | VAF | Direct Path p Value | Interpretation |
|--|-------------------|---------------|-------|---------------------|-------------------|
| bureaucratic culture -> IS conservative -> ACAP | 1.036 | 0.150 | 0.060 | n/a | no mediation |
| bureaucratic culture -> IS conservative -> agility | 0.976 | 0.165 | 0.058 | n/a | no mediation |
| innovative culture -> IS innovator -> ACAP | 4.501 | 0.000 | 0.261 | 0.000 | partial mediation |
| innovative culture -> IS innovator -> agility | 4.346 | 0.000 | 0.245 | 0.000 | partial mediation |
| involvement culture -> IS innovator -> ACAP | 3.667 | 0.000 | 0.266 | 0.000 | partial mediation |
| involvement culture -> IS conservative -> ACAP | 0.388 | 0.349 | 0.015 | n/a | no mediation |
| involvement culture -> IS undefined -> ACAP | 3.150 | 0.001 | 0.219 | 0.000 | partial mediation |
| involvement culture -> IS innovator -> agility | 3.340 | 0.000 | 0.288 | 0.000 | partial mediation |
| involvement culture -> IS conservative -> agility | 0.099 | 0.461 | 0.005 | n/a | no mediation |
| involvement culture -> IS undefined -> agility | 1.108 | 0.134 | 0.103 | n/a | no mediation |
| org support for IT -> IS innovator -> ACAP | 4.607 | 0.000 | 0.365 | 0.000 | partial mediation |
| org support for IT -> IS conservative -> ACAP | 0.652 | 0.257 | 0.019 | n/a | no mediation |
| org support for IT -> IS undefined -> ACAP | 3.312 | 0.000 | 0.277 | 0.000 | partial mediation |
| org support for IT -> IS innovator -> agility | 4.565 | 0.000 | 0.400 | 0.001 | partial mediation |
| org support for IT -> IS conservative -> agility | 0.494 | 0.311 | 0.014 | n/a | no mediation |
| org support for IT -> IS undefined -> agility | 1.860 | 0.031 | 0.167 | 0.001 | partial mediation |
| CIO structural power -> IS innovator -> ACAP | -2.629 | 0.004 | 0.342 | 0.001 | partial mediation |
| CIO structural power -> IS conservative -> ACAP | -0.511 | 0.305 | 0.018 | n/a | no mediation |
| CIO structural power -> IS innovator -> agility | -1.949 | 0.026 | 0.406 | 0.049 | partial mediation |
| CIO structural power -> IS conservative -> agility | -0.368 | 0.479 | 0.016 | n/a | no mediation |
| CIO expert power -> IS undefined -> ACAP | 3.741 | 0.000 | 0.258 | 0.000 | partial mediation |
| CIO expert power -> IS undefined -> agility | 1.510 | 0.066 | 0.095 | n/a | no mediation |

Table 5.9. Mediation Test Results for Test Set 2 (i.e. Dynamic Capabilities as Mediators)

| Mediating Relationship | Sobel z-Statistic | Sobel p Value | VAF | Direct Path p Value | Interpretation |
|---|-------------------|---------------|-------|---------------------|-------------------|
| IS innovator -> ACAP -> performance | 5.226 | 0.000 | 0.936 | 0.414 | full mediation |
| IS innovator -> agility -> performance | 5.637 | 0.000 | 0.941 | 0.414 | full mediation |
| IS conservative -> ACAP -> performance | 1.962 | 0.025 | 0.510 | 0.162 | full mediation |
| IS conservative -> agility -> performance | 1.533 | 0.063 | 0.473 | n/a | no mediation |
| IS undefined -> ACAP -> performance | -4.385 | 0.000 | 0.492 | 0.003 | partial mediation |
| IS undefined -> agility -> performance | -4.050 | 0.000 | 0.482 | 0.003 | partial mediation |

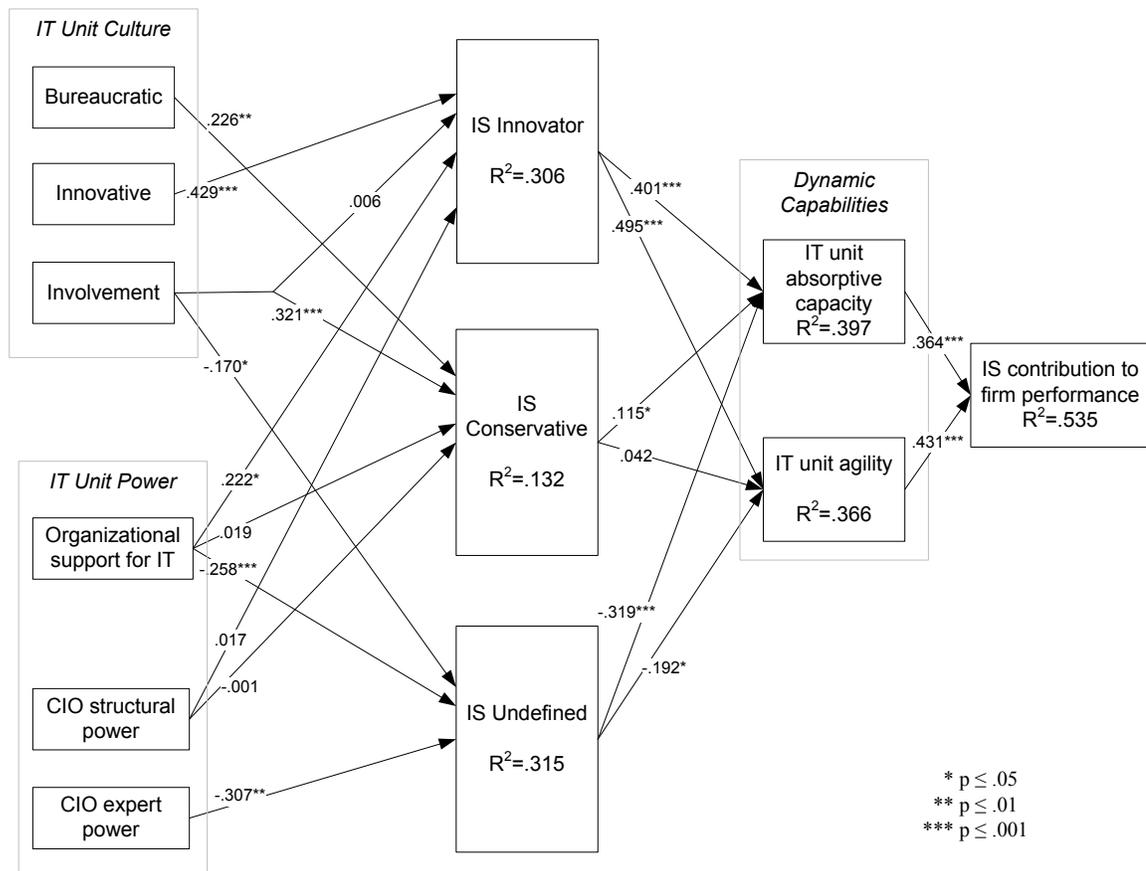


Figure 5.2. Model Results for Organizations Whose Strategies Had Been Stable for at Least Two Years

In addition, post-hoc analysis was carried out to analyze the association between CIO structural power (as represented by 1: whether the CIO is a formal member of the organization's TMT, and 2: the number of reporting levels separating the CIO from the CEO) and the endogenous constructs in the model. Table 5.10 provides the correlation results. This analysis was conducted to enhance the discussion of the antecedents in Chapter Six.

Table 5.10. Correlations for CIO Power and Endogenous Variables

| Construct | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------|---------|---------|---------|--------|---------|--------|--------|-------|
| 1. CIOStPwrTMTMember | 1.000 | | | | | | | |
| 2. CIOStPwrRptLevel | .409** | 1.000 | | | | | | |
| 3. ISInnov | -.142* | -0.075 | 1.000 | | | | | |
| 4. ISConserv | -0.037 | -0.015 | 0.06 | 1.000 | | | | |
| 5. ISUndef | .201** | 0.056 | -.354** | -.153* | 1.000 | | | |
| 6. ACAP | -.252** | -.177** | .451** | .130* | -.432** | 1.000 | | |
| 7. Agility | -.136* | -.205** | .452** | 0.102 | -.325** | .633** | 1.000 | |
| 8. ISPerf | -.226** | -.154* | .328** | .127* | -.405** | .620** | .628** | 1.000 |

Notes: For CIOStPwrTMTMember, two values are possible: 0 indicates that the CIO is a member of the Top Management Team (TMT), 1 indicates that the CIO is not a member of the TMT. For CIOStPwrRptLevel, a higher value indicates a wider distance in reporting level of the CIO to CEO.
 ** Significant at 0.01; * significant at 0.05

As part of our post-hoc analyses, we wished also to determine whether any of the control variables were correlated with the IS strategy types. For instance, it can be argued that larger organizations have more available resources for IT investments and therefore this availability of resources can lead to a greater ability to implement innovative IS strategies. However, correlation analysis did not yield significant relationships for the IS Innovator or IS Conservative with any of the control variables: CIO job tenure, CIO organization tenure, organization size, IT department size, and IT

budget. On the other hand, the IS Undefined was significantly and negatively correlated with organization size, IT department size, and IT budget, meaning that larger firms and departments tend to be less Undefined, and departments with larger budgets likewise tend to be less Undefined (see Table 5.11a).

Table 5.11a. Correlations between CIO and Firm Characteristics and IS Strategies

| Controls | IS Innovator | IS Conservative | IS Undefined |
|-------------------------|--------------|-----------------|--------------|
| CIO Job Tenure | -0.008 | -0.076 | 0.011 |
| CIO Organization Tenure | -0.067 | 0.03 | 0.049 |
| Organization Size | -0.033 | 0.002 | -.121* |
| IT Dept Size | 0.064 | 0.021 | -.167** |
| IT Budget | 0.112 | 0.049 | -.158** |

Note: ** Significant at 0.01; * significant at 0.05

The analysis for the control variable, industry type, was conducted separately because it is represented as a nominal (categorical) data type. Table 5.11b shows descriptive statistics for each industry by IS strategy type. An ANOVA test with the Scheffé method found no significant differences between industries in their implementation of any of the three IS strategies.

Lastly, in our critique of the Chen et al. (2010) IS strategy typology in Chapter Two, we mentioned that while a parsimonious typology should be sought after, parsimony should be counterbalanced with comprehensiveness. Hence, post-hoc analysis was conducted to determine a possible fourth type of IS strategy—the IS Ambidextrous, a strategy which seeks to be simultaneously innovative and conservative, explorative and exploitative. Though scholars have suggested that firms should seek to be ambidextrous (Galliers 2006), organizational research has shown that in practice most organizations are unable to be both highly innovative and highly efficient at the same time (Abernathy

1978; Benner and Tushman 2003; He and Wong 2004; Smith and Tushman 2005). Indeed, in our current sample, only 25 or 9% of the 271 organizations rated high on being both IS Innovative and IS Conservative (4 or more on a 1 to 5 scale). However, it is possible that while an organization seeking to be ambidextrous may be moderate in exploration and exploitation rather than high on both. Therefore, classifying these middle-of-the-road firms as ambidextrous could produce a larger, distinct group of hybrid organizations than suggested in the organizational research. Using this conceptualization of the IS Ambidextrous, we conducted a post-hoc analysis to determine how many organizations in our sample could be considered ambidextrous and how these ambidextrous organizations performed in relation to organizations employing the three IS strategies in the existing typology.

Table 5.11b. Descriptives for IS Strategy Types by Industry (No Significant Differences Found)

| Industry | IS Innovator | | | IS Conservative | | | IS Undefined | | |
|---------------------------------------|--------------|------|------|-----------------|------|------|--------------|------|------|
| | Count | Mean | SD | Count | Mean | SD | Count | Mean | SD |
| Manufacturing | 49 | 3.59 | 0.76 | 49 | 4.24 | 0.69 | 49 | 1.9 | 0.82 |
| Wholesale/retail trade & distribution | 26 | 3.53 | 0.73 | 26 | 4.12 | 0.65 | 26 | 1.65 | 0.52 |
| Colleges & universities | 42 | 3.38 | 0.77 | 42 | 4 | 0.77 | 42 | 2.24 | 1.08 |
| Consulting | 17 | 3.33 | 1.03 | 17 | 4.06 | 0.75 | 17 | 2.33 | 0.84 |
| Other non-profit | 2 | 3.67 | 0.47 | 2 | 4 | 1.41 | 2 | 2.33 | 1.89 |
| Financial services | 28 | 3.65 | 0.76 | 28 | 4.29 | 0.71 | 28 | 2.11 | 0.98 |
| Government | 17 | 3.78 | 0.56 | 17 | 4.18 | 0.64 | 17 | 2.14 | 0.80 |
| Service providers (web, utility) | 9 | 3.33 | 1.08 | 9 | 4.22 | 0.67 | 9 | 2.3 | 0.81 |
| Software publisher | 13 | 4.41 | 0.56 | 12 | 4.17 | 0.58 | 12 | 1.58 | 0.68 |
| Medical & health services | 30 | 3.69 | 0.79 | 30 | 4.33 | 0.66 | 30 | 1.9 | 0.64 |
| Research | 3 | 3.78 | 0.51 | 3 | 4 | 0.00 | 3 | 3.11 | 0.77 |
| Construction | 8 | 3.75 | 0.66 | 8 | 4.25 | 0.71 | 8 | 1.46 | 0.43 |
| Publishing/media | 10 | 3.9 | 0.63 | 10 | 4.1 | 0.74 | 10 | 1.97 | 0.85 |
| Telecommunications | 5 | 4 | 0.75 | 5 | 4.6 | 0.55 | 5 | 2 | 0.85 |
| Transportation/storage | 7 | 3.71 | 0.45 | 7 | 3.57 | 0.98 | 7 | 1.76 | 0.66 |

Note: ANOVA test with Scheffé method showed no significant differences between industries for any IS strategy type.

We classified an organization as IS Undefined if it rated, on average, highest on the IS Undefined items. The remaining organizations are classified as IS Innovator, IS Conservative, or IS Ambidextrous. Organizations were classified as ambidextrous if their ratings for both the innovator and conservative strategy items were, on average, above the sample means for IS Innovator and IS Conservative, respectively. Otherwise, they were classified as either innovator or conservative depending on the strategy on which they rated higher. From our sample of 271 organizations, the classification resulted in 61 IS Innovators, 138 IS Conservatives, 58 IS Ambidextrous, and 14 IS Undefined. The average contribution to performance of each IS strategy group varied as well, with the IS Undefined having the lowest average performance, as expected. However, the highest performance is found for the IS Ambidextrous group, followed by the IS Innovators, and then the IS Conservatives. Table 5.12 provides descriptive and comparison statistics for the results of the four IS strategies discussed.

To determine whether the differences in the means of organizational performance for each group of IS strategies were statistically significant, we used an ANOVA test with Scheffé's method. The Scheffé method is used for multiple comparisons and is suitable whether sample sizes are equal or unequal (Garson 2011). Results from this analysis revealed that the mean performance between IS Ambidextrous and IS Innovator organizations was not statistically significant but that the difference between IS Ambidextrous and IS Conservatives was statistically significant, as was the difference between IS Ambidextrous and IS Undefined. Table 5.12 summarizes the results of the comparison.

Table 5.12. Extended IS Typology with Performance Comparison

| IS Strategy | Count | % of Sample | Comparison of Performance | | | |
|-----------------|-------|-------------|---------------------------|----------|---------------------------------|----------------|
| | | | Mean | St. Dev. | IS Strategy | Sig. |
| IS Innovator | 61 | 22.5% | 3.77 | 0.708 | | |
| IS Conservative | 138 | 50.9% | 3.51 | 0.669 | | |
| IS Ambidextrous | 58 | 21.4% | 3.86 | 0.610 | IS Conservative | 0.011 |
| IS Undefined | 14 | 5.2% | 3.16 | 0.578 | IS Innovator IS Ambidextrous | 0.023 0.006 |

Note: Only strategy comparisons that have significant differences at .05 using the Scheffé method are shown.

CHAPTER SIX

Discussion

In this study, we drew upon two major theories in the literature—the power and politics perspective and the dynamic capabilities perspective—to forward a theory of IS strategy, a Type IV theory (Gregor 2006) for explanation and prediction of a firm’s IS strategy. The power and politics perspective was used to identify and explain in the hypotheses development why organizations choose to implement to a greater degree one type of IS strategy over others, and the dynamic capabilities perspective was used to predict the outcomes of each IS strategy in terms of its contribution to important outcomes, such as absorptive capacity, agility, and ultimately contribution to the organization’s performance. This chapter correspondingly discusses the findings regarding the antecedents of IS strategy, which was based on the power and politics perspective, and the impacts of IS strategy, which was based on the dynamic capabilities perspective. Implications both for practice and future research are discussed and the contributions to theory and limitations of the study are presented.

Antecedents to IS Strategy

Drawing on the power and politics perspective, we hypothesized in the research model that the culture and power of the IT unit would be significantly associated with the type of IS strategy that is implemented by the department. IT department culture, which likely reflects the organization’s culture, has potentially a considerable effect on the implementation of an IS strategy because the cultural landscape shapes the attitude, and

thus perspective, of the department. The findings for culture all supported the hypothesized relationships, except for the first part of H1c which hypothesized that involvement culture was positively associated with IS Innovator strategies. The findings for involvement culture (H1c and H1d) suggest that when departmental members actively participate and are highly involved in the affairs of the department, the IS strategy is more likely to be defined rather than be left undefined, but still the IS strategy is not necessarily one of innovation. Stated simply, involvement does not signify innovativeness; rather, an innovative culture where dynamism, creativity, and risk taking abound is one in which innovative IS strategies seem to be supported (H1b).

While we had argued in the hypotheses development that culture theoretically impacts strategy, it can easily be contested that strategy also influences culture by ultimately necessitating a shift in the cultural environment in order to support an IS strategy that is chosen by the upper echelon of the organization. For example, organizations have hired new CIOs who radically changed the human resources, processes, infrastructure, and partnership relations of their IT departments within the first year of their transition into the CIO role (Leidner and Mackay 2007). With these changes in strategy, the culture of the department must also change in response to the changes in strategic direction, or else the department would potentially suffer the consequences of a culture-strategy misalignment, a misalignment that can slow the progression of or otherwise impair strategic implementation efforts (Yemm 2006). For instance, we interviewed the CIO of a large travel company who mentioned that the company transformed, over the past few years, its IT department's software service model. The CIO stated that this was a dramatic shift in the department's strategy and that although

much effort has been put into shifting the culture to fit the new strategy, management was still in the final stages of molding the culture to best align with the strategy. He expressed that changing the culture was a very difficult undertaking, but was something that needed nonetheless to be accomplished in order to consider the strategic change a success. Therefore, the relationship between culture and strategy is more complex than originally hypothesized. While culture can facilitate or inhibit strategy implementation, strategy can also, in due course, be the reason for top management to drive a culture change down to the personnel level.

Culture, however, cannot be changed overnight; it is a stable and pertinacious set of social norms and values held by a group of people. Nevertheless, given strong authority, leadership, and persistence, it is possible to shape and form the culture of a department or organization. We can use our interview of the CIO of a company in the transportation industry as an illustration. This CIO had to reposition the IT unit as a service provider from one that acted as a “guardian of technology”; thus, to support the new approach to IS, he needed to change the mentality of the people in the department. An effortful transformation it has been, but he believes the conversion process has passed the most difficult half. Said he, “I’ve got about 65 people in IT here. I would say the vast majority of them now understand the service provider model and mentality and behavior. There are a few that still don’t; they have to be reminded every now and again... it’s an ongoing process, but [we’re] certainly well past the critical point”. As this example demonstrates, culture can be molded, but with persistence and over a long-term period.

As culture shapes the political landscape of the IT department, so too does power shape the final strategic decisions of the department. Two types of power were tested in this study: IT unit power and CIO power. As earlier suggested, IT unit power, as represented by organizational support for IT, should provide the necessary slack resources for the department to explore and experiment with IS initiatives and thus contribute to its ability to be innovative (H2a). Organizational support helps the IT unit absorb the risks associated with IS initiatives without jeopardizing the budget for the basic services that IT must maintain in support of the business. The hypothesis was supported. However, without the suitable organizational resources to sponsor an innovative IS approach, the department would be unable to consistently pursue an IS Innovator strategy (H2b, H2c). While H2c, which hypothesized that organization support for IT would be negatively associated with IS Undefined strategies, was supported by the results of our study, H2b, which hypothesized that organization support would be negatively associated with IS Conservative strategies, was not supported. The reason for this non-significant finding perhaps lies in the idea that the IS Conservative approach is the default approach for many organizations, especially those within certain industries (Chen et al. 2010). In many cases, top managers may still take the traditional view of IT a “necessary evil” (Kaarst-Brown and Robey 1999; Lederer and Mendelow 1988; Lee and Bhattacharjee 2011; Livermore, Ragowsky, and Lewis 2010), perceiving it as necessary to increase the efficiency of transaction processing and other operations, but evil because of the high costs associated with providing such services (Lederer and Mendelow 1988). Consequently, managers may, by default, take the conservative approach to IS regardless of the funding received from the organization. This would

explain, at least partially, the non-significant association between organizational support and the IS Conservative strategy.

Although the association between organizational support for IT and the IS Innovator and IS Undefined strategies were supported (H2a and H2c), the direction of influence as illustrated in the research model may not be unidirectional. Alternatively, we believe the relationships may be tied with performance and is an iterative process. Top management is likely to look positively upon the IT department implementing an innovative IS strategy that greatly contributes to firm performance and negatively upon an underperforming IT department with an undefined IS approach. (The results for the relationships between IS strategy and performance can be seen in the latter hypotheses regarding the impacts of IS strategy.) While the organization will be encouraged to empower with additional resources a high performing IT department, it will not wish to continually invest at the same level in an underachieving department. Therefore, the level of organizational support may be iteratively tied with IT department performance outcomes over time such that higher performers will be awarded with more organizational support and lower performers will gradually receive budget cuts.

The second type of IT unit power included in this study, CIO power, is represented as CIO structural power and CIO expert power. CIO expert power is strongly related to IS strategies. It is, as hypothesized (H3c), negatively associated with IS Undefined strategies, and it is also moderately correlated (.428) with IS Innovator strategies, as shown in Table 5.4. CIO structural power, on the other hand, was unrelated to IS strategies, so the accompanying hypotheses were unsupported (H3a, H3b). Indeed, in a recent study, Banker, Hu, Pavlou, and Luftman (2011) challenged the assumption

implied in many studies that suggest that the strategic role of IT in a firm determines the CIO reporting structure (Banker et al. 2011). Alternatively, they showed that it is the strategic positioning of the firm itself that is associated with CIO reporting structure. Thus, our finding that CIO structural power is unrelated to the IS strategies is consistent with the results of Banker et al.'s (2011) study. But upon further examination in post-hoc analyses, we found significant correlations between CIO structural power and several endogenous variables (see Table 5.10). Recall that CIO structural power is represented by two items: whether the CIO is a formal member of the organization's TMT and the number of reporting levels that separate the CIO from the CEO. The correlations in Table 5.10, while significant, are low and none of the significant correlations between CIO structural power and the endogenous variables are particularly surprising. They merely suggest that when the CIO is a formal member of the TMT or is closer to the CEO in reporting structure, the IS strategy is more likely to be innovative and not undefined, and the IT department's absorptive capacity, agility, and performance tends to be, in general, higher. The strength of these individual correlations between CIO structural power and IS strategies are diminished in the overall research model because the model takes into account other variables that are more strongly related to the IS strategies. Taken together, the finding that expert power is related to IS strategies (H3c), but that structural power is not (H3a, H3b) suggests that the formal, structural authority of the CIO within the organization really does not much affect the IS approach it chooses to implement, given that other factors remain constant. Rather, it is the credibility and respect commanded by the CIO's expertise, not his or her hierarchical reporting structure per se, that influences the type of strategic IS approach the IT department implements.

Besides testing the direct association between the antecedents and IS strategies, the indirect effect of the antecedents on the two dynamic capabilities—absorptive capacity and agility—mediated through the IS strategies were also tested and results are provided in Table 5.8. Because numerous other factors can contribute to the reasons that organizations pursue a particular type of IS strategy, it is not surprising then that the three IS strategies either did not mediate or only partially mediated the relationships between the antecedents and dynamic capabilities. Other factors left unexplored in this study, such as competitor strategies, general environmental turbulence within a given industry, and government regulations can dictate whether the IT department must be innovative in order to competitively survive or must be conservative in order to abide by regulations. Such factors have already been alluded to in our CIO interviews. For example, the CIOs of a mortgage lending firm and a healthcare provider whom we interviewed indicate that government regulation was a major factor that they needed to consider in executing their IS strategies. Government imposes strict ordinances in their respective industries and sometimes those laws can dictate the extent to which their IT departments can be innovative. Suggested the CIO of the healthcare company, “The biggest challenge of all [in executing the strategy] is resources: money and people with so many competing initiatives going on; and number 2, which is the government continually changing the rules on us.” Government regulations certainly can direct the type of investments organizations must make. For instance, in the case of the healthcare company, government mandates drive the company’s investment in information systems and technologies that are required in order to support electronic health records. These and other factors will be further discussed in the Implications for Research section.

Lastly, because it can be argued, for instance, that larger organizations or departments with greater IT budgets can better afford to implement innovative IS strategies, we conducted post-hoc analyses to determine whether control variables were correlated with any of the IS strategy types. The results, presented in Tables 5.11a and 5.11b, show that in general the variables CIO job tenure, CIO organization tenure, organization size, IT department size, IT budget, and industry type were unrelated to the defined IS strategy types. However, it was found that there are low, but statistically significant negative correlations between the IS Undefined strategy and organization size, IT department size, and IT budget, meaning that larger firms and better funded departments tend to have a strategy that is less undefined. This finding is unsurprising in light of the findings and discussions presented earlier regarding organizational support and resources.

Impacts of IS Strategy

Drawing on the dynamic capabilities perspective in the proposed research model, defined IS strategies were hypothesized to positively relate to IT department absorptive capacity (H4a and H4b) and while conservative strategies were posited to negatively relate to agility (H4e), innovative strategies were posited to positively relate to agility (H4d). In contrast, undefined strategies were theorized to be statistically unrelated to either absorptive capacity or agility (H4c and H4f). However, only 2 of the 6 hypotheses were supported in this study. Perhaps most intriguing is the unexpected finding that, rather than being unrelated, undefined IS strategies were in fact significantly negatively associated with both absorptive capacity and agility (results for H4c and H4f). In other words, having little or no definitive long-term goals or formally defined strategies for IS

tends to prove detrimental to the IT department's dynamic capabilities development. One major reason for this negative impact might be that an undefined strategy is potentially indicative of a larger issue in the department or organization. For instance, departments without an IS strategy may simply reflect an unorganized department that has poorly defined policies and procedures or simply one that does not enforce its policies and procedures. For example, in a poorly organized department, after an IS solution is found for a non-routine problem, procedures are not taken to properly document the solution nor is the knowledge appropriately transferred within the department. As a result, valuable knowledge is lost. This scenario impedes the development of absorptive capacity because the department would need to practically reinvent the solution each time. Another reason for a negative relationship between IS Undefined and dynamic capabilities may be related to the CIO's leadership, more specifically, to his or her expert power. CIOs with higher expert power are seen as strategic leaders and visionaries within the firm. With a lack of a strategic visionary to organize the IT unit, the capabilities development of the unit may also be lacking because a strong defense/offense often needs strong leadership. This can be seen in the significant negative relationship between CIO expert power and the IS Undefined strategy (H3c) and the strong correlations between CIO expert power and absorptive capacity (0.479) and agility (0.542) in Table 5.4.

The hypotheses positing that IS Conservative will be positively related to absorptive capacity (H4b), but negatively related to agility (H4e) were likewise unsupported. Both relationships were non-significant in the overall model. However, as shown in the post-hoc analysis results in Figure 5.2 of Chapter Five, when considering

only the 153 organizations that have had no major shifts for the past two years in IS strategy, the association between IS Conservative strategy and absorptive capacity becomes significant at $p < .05$, which suggests that given time, a consistent but cautious approach to IS, as that taken by IS Conservatives, can still contribute to the development of absorptive capacity as hypothesized. On the other hand, while we expected the IS Conservative's rigid systems of routinization and codification to run counter to the development of agility, the study did not support this hypothesis. Rather, the IS Conservative is unscathed in terms of its agility development. This raises the question of whether IS Conservatives really develop systems and processes that are rigid, or whether rigid systems and processes are actually antagonistic to agility as suggested by Seo and La Paz (2008). We suspect that the IS Conservative does not have all its processes codified and routinized to the point of rigidity, and therefore the hypothesized relationship was not found.

The research results support the dynamic capabilities perspective. As we earlier stated, the dynamic capabilities perspective posits that firms demonstrating the ability to provide flexible product innovations and timely responses in turbulent environments will be the ones able to achieve business advantage over their competition (Teece et al. 1997). The results of this study greatly bolster the central proposition of the dynamic capabilities perspective. As shown in Figure 5.1 of Chapter Five, the IT unit's capabilities in the areas of absorptive capacity and agility alone explained nearly 50% of the variance in its contribution to the organization's performance. The beta weights were also very strong ($\beta = .366$ and $\beta = .401$) for the relationships between absorptive capacity and performance, and agility and performance, respectively, with p-values less than .001.

Furthermore, when considering only the 153 organizations that have had stable IS strategies for the last two years, absorptive capacity and agility explained more than 53% of the variance in performance. This imparts robust empirical support to the dynamic capabilities perspective and indicates that not only is the perspective applicable to the organization as a whole, but applies substantially well to an individual unit within the organization in terms of its contribution to the organization's competitive advantage.

Lastly, in the introduction, we denoted that IS strategy does not directly lead to performance gains, but rather it is the IT department's consistent enactment of its IS strategy that develops certain dynamic capabilities, which in turn create efficiency and effectiveness gains that contribute to organizational performance. Indeed, we found empirical support for this assertion via the mediation test results (Table 5.9). The two dynamic capabilities either fully or at least partially mediated the relationships between the IS strategies and performance, except for one—the mediation through agility for the IS Conservative. However, it would have been possible to claim full mediation if the $p < .05$ criteria were to be relaxed to .063 or higher (the Sobel p -value for this mediation is .063). The full mediation through the dynamic capabilities for the IS Innovator was incredibly robust with VAF values indicating that approximately 94% of the total effect of the IS Innovator strategy on performance is explained by its indirect effect through either absorptive capacity or agility. This finding suggests that of the strategic IS approaches, the IS Innovator's ability to contribute to performance is almost fully dependent on its formation of dynamic capabilities. These capabilities are the factors really driving the performance gains for the IS Innovator. Contrarily, the partial mediation for the IS Undefined strategy implies that its low absorptive capacity and

agility levels only partially explain its poorer performance. Other factors outside of the scope of this study, such as poor management and organization and lack of enforcement of policies and procedures, may also be contributing negatively to its performance.

The results of this study offer some explanation for the negative association found between undefined IS strategies and performance in two recent studies (Leidner et al. 2010; Leidner et al. 2011). We substantiate the findings of the two prior studies, but also qualify them by concluding that the negative association is partially mediated by absorptive capacity and agility or rather, the lack thereof. The lack of dynamic capabilities, which appear characteristic of the IS Undefined, will hinder performance. This association between dynamic capabilities and performance is explicit in the dynamic capabilities view.

IS Strategy Typology

The post-hoc analysis showed that when firms that are both moderately innovative and conservative are considered ambidextrous, they compose a larger proportion of the sample and, on average, tend to perform better than firms that implement any other IS strategy in the typology. The results reveal some interesting insights regarding IS strategies and performance. The finding that only 9% of the sample can be classified as both highly innovative and highly conservative is consistent with extant organizational research; however, if organizations that are both moderately innovative and conservative are considered ambidextrous, then the percentage of organizations in the sample meeting this criterion increases to 21%. Thus, it appears that firms do seek to be ambidextrous, as some scholars have recommended, but are mostly unable to excel at both simultaneously. Notwithstanding most organizations' inability to

be excellent at both strategies, if they merely rank above average on both innovative and conservative strategies, they will tend to outperform organizations that focus on either one or the other, as shown in Table 5.12 of Chapter Five. Therefore, organizations that attempt to be both innovative and conservative appear to outperform those that do not.

Implications for Research

Several areas for future research follow from the findings of this study on IS strategy. First, because of their supreme value, dynamic capabilities are major assets to any organization, and therefore pursuit of a strategy that helps augment an organization's dynamic capabilities would prove considerably remunerative. Though IS Innovators exemplify the ability to effectively produce dynamic capabilities, IS Conservatives do not, and the IS Undefined especially exhibits quite the contrary. The IS Undefined appears to be suffocating its development of both absorptive capacity and agility, and ultimately its ability to contribute to firm performance. Future research should investigate how organizations can quickly liberate themselves from the entrapment of being in a state IS Undefined. Perhaps existing literature on the IS strategic planning process (e.g. Das et al. 1991; Galliers 1991; Levy, Powell, and Galliers 1999; Mintzberg and Lampel 1999; Porter 1996; Premkumar and King 1994; Scott 2005; Teubner 2007) might be a place to start the investigation, but we must, in addition, keep in mind that the IS Undefined may have an existing strategy, but do not consistently follow through with it. In such case, then, the problem would be to examine how to motivate the IT department to consistently act upon its strategy. In the case of motivating the department to perform, perhaps theories of leadership (e.g. Ferris, Treadway, Perrewe, Brouer, Douglas, and Lux 2007; Kark and VanDiji 2007; Sparrowe and Liden 2005; Wayne,

Shore, and Liden 1997) and motivation (e.g. Ambrose and Kulik 1999; Meyer, Becker, and Vandenberghe 2004; Mitchell 1997) would be appropriate starting points for future research.

Second, it has been demonstrated in prior research that both the internal and external environments can play a role in shaping an organization's perspectives, perceptions, and intentions regarding IS (Melville, Kraemer, and Gurbaxani 2004; Teo, Wei, and Benbasat 2003). However, thus far, we have only examined the antecedents of IS strategy from the power and politics perspective and primarily assessed antecedent factors that are internal to the organization. Since external environmental factors should also have a strong bearing on an organization's IS strategy, future research should examine the impact of external factors such as market turbulence, technological turbulence, government regulations, and competitor strategies. To launch the examination, future research can draw upon institutional theory (e.g. DiMaggio and Powell 1983; Zucker 1987), a theory relating to the competitive or industry level, which argues that organizations are becoming homogeneous rather than differentiated in their forms and practices. In their competition for resources, political power, and social and economic fitness (Carroll and Delacroix 1982), organizations are pressured to conform to sanctioned conceptions of forms and behaviors in order to gain institutional legitimacy and market positions (DiMaggio and Powell 1983). Institutional theory, therefore, suggests that external forces may potentially affect the firm's perspective and IS strategy approach. Institutional theory has provided significant insights about the importance of institutional forces on the organization's structure and actions in the management and sociology research areas (Fligstein 1985; Goodstein 1994; Han 1994; Teo et al. 2003;

Tolbert and Zucker 1983). In IS research, a survey of the literature reveals that institutional theory has been used to explain the adoption of interorganizational information systems (e.g. Teo et al. 2003) and business process standards (e.g. Bala and Venkatesh 2007), but not IS strategy formation per se. If the theory has lent influential insights to other research disciplines as well as the IS discipline, we believe it would also enlighten our investigation of the external environmental forces that help shape the firm's IS strategy since strategy can also be thought of as a type of organizational structure or behavior.

Third, since the post-hoc analysis showed that organizations that attempt to be ambidextrous tend to outperform those that lean towards either innovative or conservative strategies, future research should extend the Chen et al. (2010) IS strategy typology to reconsider the fourth potential strategy—the IS Ambidextrous—and offer some leniency in classifying organizations as ambidextrous because, as we have observed in the current sample, organizations that are even moderately ambidextrous are surprisingly the highest performers. Further consideration is also needed to establish a consistent means of empirically distinguishing the IS Ambidextrous strategy from that of the IS Innovator and IS Conservative. Although sufficient for this study, the method used in our post-hoc analysis may or may not be the best approach to categorization. In addition, forcing the use of a categorization approach on the IS strategy typology will dilute the measurement of each strategy type because scales will no longer measure the extent to which an organization follows, for example, an innovative, or a conservative, or an undefined strategy. But using an ordinal or interval scale, commonly employed with a Likert-type response scale, on the other hand, will produce responses for IS

Ambidextrous that overlap with IS Innovator and IS Conservative responses, resulting in issues of multicollinearity among the IS strategy constructs. Hence, future research should consider not only extending the IS strategy typology but as well how best to operationalize it.

Implications for Practice

Overall, the results of the study suggest that in order to contribute significantly to the organization's performance, IT departments should strive to take an innovative approach to IS. Consistent attempts to explore and rapidly respond to IS opportunities, which are characteristic of innovative strategies, will not only correspond to higher performance levels, but also help build and sustain departmental capabilities, capabilities that are necessary to achieve continuous competitive advantage. We believe it is not too late for an organization to change or refocus its IS strategy, provided that it has the supporting structures in place, that is, the structures which have been modeled as antecedents in this study, among others factors. Organizations desiring to move towards an IS Innovator strategy should first, besides providing IT the necessary budgetary funding to facilitate innovation, empower its IT department by bringing on board a CIO with the IS and management expertise to command change and manage uncertainties in the organizational environment with regard to IS. Note that although not in the research model, the correlation between CIO expert power and IS Innovator strategy is relatively high at .428 (see Table 5.4), but is virtually uncorrelated with IS Conservative strategy (.094), which suggests that CIOs with expert power tend to pursue innovative strategies. The CIO should not only be credible and authoritative in information technologies, but also in personnel and process management because he or she will need to impose a

culture change, if necessary, on the department in order to align culture with strategy. Even though departmental culture, to a certain extent, reflects organizational culture, it is not necessarily dependent on organizational culture (Hofstede 1991, 1998), so the CIO can promote an innovative culture within the department itself by rewarding creativity and informed risk taking. However, culture change is perhaps the most challenging of all tasks that should be implemented in order to support the chosen strategy. Indeed, when asked of CIOs during our interviews what their biggest challenge was in executing their strategies, many answered: the culture. Stated one CIO of a financial lending company, “In my mind, the biggest challenge was changing the culture of the IT group”, and another IT executive of a prominent manufacturing company, “The biggest challenge is culture. IT management hasn’t put enough into the people factor.” Consequently, the CIO needs not only to manage technological changes, but cultural transformations as well.

Furthermore, CIOs who manage an IT department in which the IS strategy is undefined or ill-defined should recognize the damaging nature of such a lack of strategy in terms of both absorptive capacity and agility development, and ultimately its ability to contribute to firm performance. These CIOs should also work steadfastly to draft a strategic IS approach, even a conservative approach, have it ratified by the TMT, and follow through consistently to this approach. This would initially help the IS Undefined department extricate itself from a cycle of poor performance and derelict capabilities preservation. Existing resources are available for guiding us on the strategic planning process (e.g. Das et al. 1991; Galliers 1991; Levy et al. 1999; Mintzberg and Lampel 1999; Porter 1996; Premkumar and King 1994; Scott 2005; Teubner 2007), which could

be a starting point for crafting an IS strategy. This strategy could then be refined as appropriate to improve outcomes and to fit the organization's needs.

Contribution to Theory

We have forwarded and tested, in this dissertation, a theory of IS strategy based on a recently reconceptualized typology (Chen et al. 2010) of IS strategy, a reconceptualization that we believe was a constructive step in unifying and progressing existing research on IS strategy. This dissertation has further advanced the research arena relating to the strategic value of IS, in particular, by contributing to filling the research gap by assessing the antecedents and impacts of the IS strategy itself. In effect, this dissertation has proffered a theory for explanation and prediction of IS strategy. Gregor (2006) suggests that a theory for explanation and prediction (a Type IV theory) states “what is, how, why, when, where, and what will be” (p. 620). And according to Whetten (1989), a theory contains four elements: what, how, why, and the boundaries of the theory, namely who, where, when. There is much overlap between Gregor's and Whetten's criteria for what constitutes a theory, with the difference being that Gregor adds an element of “what will be” for the prediction aspect of the theory. The what, how, and why are essentially illustrated by the “boxes and arrows” in the research model in Figure 3.2 of Chapter Three. First, the “what” refers to factors that are relevant to the theory, i.e. the “boxes”. In this case, there are 12 factors or constructs that are part of the theory. Second, the “how” refers to how the factors or boxes are related, i.e. the “arrows”, which are also illustrated in the model to represent the relationships among the factors. Third, the “why” refers to the logic that explains the phenomenon of the theory. This logic is found in the hypotheses arguments for each relationship in the model.

Fourth, the boundary conditions who, where, and when set the limitations of the theory. We have tested several control variables in the research model and have yet to find clear boundaries for the proposed theory. Future research is needed to discover the boundary conditions of the theory; for instance, does the theory hold for different country contexts? And finally, the prediction aspect of the theory is represented on the right side of the model, that is, the impacts of IS strategy in terms of departmental capabilities and performance.

In addition to these elements of a theory, Bacharach (1989) suggests that a theory should be falsifiable and useful. Falsifiability determines whether a theory is constructed in such a way that it can be refuted empirically. We have empirically tested our theory of IS strategy and found that 8 of the 18 relationships were unsupported and have thus already empirically refuted parts of the theory. The unsupported relationships were then discussed in detail earlier in this chapter. The usefulness (or utility) of a theory is determined by its ability to both explain and predict (Bacharach 1989; Weick 1995), which is parallel to Gregor's (2006) Type IV theory for explanation and prediction and which we have previously discussed. Furthermore, it has been suggested that a theory is a continuum rather than a dichotomy (Weick 1995) and therefore a theory can be a work-in-progress that is ultimately contested, refined, and confirmed. We have offered here such a theory with the hopes that future research will contest, refine, and confirm it in order to continually build upon the existing knowledge base in the literature.

Limitations

The findings of this study should be interpreted with an awareness of the study's limitations. Due to the cross-sectional nature of the data collected, no causal

relationships can actually be confirmed, though it can be inferred from the CIO interviews that some of the relationships may be iterative, as was discussed earlier in this chapter. And as with any survey-based study, the accuracy of self-reported data is subject to the perspective of the individual participants responding to the survey. This is the case not only with surveys, but with interviews and other studies involving human subjects in which humans must make subjective judgments; these are nevertheless commonly accepted methods of research. In our case, since a single respondent was used to assess each department represented in the sample, the data would be internally consistent, which was confirmed in the factor analysis. Data that is internally consistent allows us to assess the degree or strength of the relationships among concepts and as such, self-reported data is appropriate for the method of data analysis used in this study, i.e. PLS.

Aside from the limitations of the study, we acknowledge as well the potential limitations of the proposed theory. In an attempt to develop a somewhat parsimonious model, we may have omitted other factors that may be of equal relevance in a theory of IS strategy. For example, as was mentioned in the future research section, external environmental factors can play a significant role in shaping an organization's perspectives, perceptions, and intentions regarding IS and therefore should perhaps be included in the theory. In spite of these limitations, we believe that the proposed theory and empirical study offers some valuable insights into an important topic and fills some of the gaps in our existing knowledge base.

CHAPTER SEVEN

Summary and Conclusion

As business strategy is vital to the success of an organization, so an organization's IS strategy is central to the successful functioning of its IT department. Even while research has amply focused on topics relating to the strategic value of IS, much of it concentrates on three areas of the literature: strategic information systems planning, strategic alignment, and IS for competitive advantage. Fewer studies have assessed the impact of the IS strategy itself, which is an important avenue through which firm performance may be realized. In response, we have in this dissertation proposed and tested a theory of IS strategy that seeks to link IS strategy to IS's contribution to firm performance by showing that the consistent pursuit of certain IS strategies aids the development of dynamic capabilities for the business unit, which in turn create gains in efficiency and effectiveness that contribute to the organization's overall performance. Drawing upon two major perspectives, the power and politics perspective and the dynamic capabilities perspective, we presented a research model that identified antecedents and anticipated impacts of IS strategies. To test the proposed model, responses from 271 CIOs were collected via an online-based survey and analyzed. Results suggest that the culture and power of the IT department are significantly associated with the type of IS strategy that the department predominantly implements. In particular, results suggest that when departmental members actively participate and are highly involved in the affairs of the department, the IS strategy is more likely to be defined than be left undefined. But involvement does not signify an innovative IS

strategy; rather, an innovative culture where dynamism, creativity, and risk taking abound is one in which innovative IS strategies seem to thrive. On the other hand, departments whose cultures are characterized by bureaucracy seem to be less innovative and tend to adopt more conservative IS strategies. With respect to the role of power, IT units with more power in terms of organizational resource support and CIO expertise are more likely to implement innovative IS strategies. However, the CIO's structural power was unrelated to the type of IS strategy implemented, suggesting that the CIO's formal reporting structure, unlike his or her expert power, has little significance in regards to the IS strategy that is chosen.

The study's results also provide interesting insights into the impacts of IS strategy. While, as hypothesized, innovative IS strategies reinforced IT departments' dynamic capabilities development, undefined IS strategies, on the other hand, tended to prove detrimental to their capabilities development. And implementing conservative IS strategies were found, for the most part, to neither help nor hurt IT departments in terms of their dynamic capabilities development. Furthermore, as suggested by the dynamic capabilities perspective, those firms that possess dynamic capabilities tend to outperform those that do not. Indeed, the impact of the IS strategies on performance was found to be mediated through the dynamic capabilities—absorptive capacity and agility. In fact, the IS Innovator's ability to contribute most superiorly to firm performance can be fully explained by its ability to develop absorptive capacity and agility. The IS Innovator strategy led the way in terms of performance, followed by the IS Conservative, and lastly the IS Undefined, whose lack of strategy tends to prove harmful to its ability to contribute to the organization's performance. Post-hoc analysis revealed a fourth possible IS

strategy, one that strives for ambidexterity in both innovative and conservative approaches to IS. Ambidextrous firms were found to be associated with the most superior performance, leading to a potential extension of the existing IS strategy typology that should be further explored in future research.

The overall findings suggest that since dynamic capabilities are major assets to any organization, the pursuit of a strategy that helps enhance an organization's dynamic capabilities would be substantially advantageous to its performance capability. And one way in which dynamic capabilities can be developed and sustained is through the consistent implementation of innovative IS strategies. IT departments that strive to take an innovative approach to IS by consistently exploring and responding to IS opportunities would be in better positions to achieve continuous competitive advantage. Conversely, departments characterized by a predominantly undefined IS strategy or those that are ill-defined in major areas of their IS strategies must recognize the damaging nature of such a lack of strategy and quickly take action to remove themselves from the undefined state. CIOs of such departments should work steadfastly to draft a strategic IS approach, even a conservative one, have it ratified, and follow through consistently to this approach even as a short-term solution until a longer-term solution can be arrived at. Although a conservative IS approach may not significantly contribute to the development of absorptive capacity and agility, it has the ability to withstand the effect of deterioration in the department's dynamic capabilities. Subsequently, for firms that wish to implement a long-term conservative IS approach, the short-term solution can then be refined as appropriate, taking into account the needs of the business and the demands of the particular industry and government regulations. For organizations desiring to move

towards an innovative approach to IS, they should, besides providing IT the necessary budgetary funding to facilitate innovation, empower its IT department by bringing on board a CIO with the IS and management expertise to command change and manage uncertainties in the organizational environment with regard to IS. The CIO should not only be credible and authoritative in information technologies, but also in personnel and process management because he or she will need to impose a culture change, if necessary, on the department in order to align culture with strategy, and to promote innovative IS strategies, he or she must offer a system that rewards employees for creativity, results-orientation, and informed risk taking.

Although an innovative IS approach may not be right for all organizations given the constraints within each industry sector, this study has shown that innovation tends to provide, in general, a performance advantage over less innovative approaches. As Gregg Garrett of the Volkswagen Group of America said, the acronym CIO should no longer stand for Chief *Information* Officer but Chief *Innovation* Officer. And as the CIOs of major corporations recently indicated, the future of both national and corporate competitiveness depends on firms' ability to innovate, and that this ability to innovate is tied intensely to new technologies. The results of this study certainly attest to the idea that innovation is fundamental to competitive success. But to enable this innovation with IT, the organization's IS strategy must be a key component, a source of stability that provides a focused strategic direction, that drives this innovation.

Our study of IS strategy exemplifies a topic in IS research that exhibits the practical relevance that researchers in the IS field argue is important in IS research (Benbasat and Zmud 1999; Wade, Biehl, and Kim 2006; Whinston and Geng 2004),

along with, we hope, the scientific rigor that is called for of studies in the IS discipline. We have proposed and tested a theory of IS strategy with the hopes that future research will refine, refute, and/or confirm it in order to expand the breadth and depth of our existing knowledge base.

APPENDICES

APPENDIX A
Online Survey Instrument

Page 1 of 3

What is your official title?

Are you the Chief Information Officer (CIO) or highest ranking IT executive in your organization?

Yes No

* For the remainder of the survey, the highest ranking IT executive will be referred to as the CIO.

In the last 5 years, how many different CIOs has your organization had?

Please answer the following:

| | ___ years (enter a number) | and ___ months (enter a number) |
|--|-------------------------------|------------------------------------|
| How long has the CIO been in his or her current position? | <input type="text"/> | <input type="text"/> |
| If different from above, how long has the CIO worked for the organization? | <input type="text"/> | <input type="text"/> |

Is the CIO a formal member of your organization's Top Management Team (TMT)?

Yes No

How many reporting levels are between the CIO and the CEO?

Please assess the following about your organization's general, long-term information systems (IS) strategy.

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Our IT department strives to be a leading IS innovator in our industry. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department seeks to explore new IS initiatives even if not all of these efforts prove to be highly profitable. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department responds rapidly to early signals concerning areas of opportunity for IS. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department mainly seeks to gain efficiency by refining existing IS practices and technologies. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department adopts promising IS innovations once these initiatives have been proven in our industry. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| IS innovations are carefully examined before they are chosen by our IT department. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department does not have definitive long-term IS goals. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department does not have an articulated IS strategy. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department does not have a consistent pattern of behavior regarding IS. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department equally endeavors to explore new IS practices and technologies while concurrently refine existing ones. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| Both taking the time to cautiously examine new technologies and being able to rapidly respond to new IS opportunities are equally emphasized by our IT department. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department strives to be equally innovative and efficient. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department values innovation, but not at the expense of efficiency. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department values efficiency, but not at the expense of innovativeness. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please answer the following:

| | Every ___ years (enter a number) | and ___ months (enter a number) |
|---|-------------------------------------|------------------------------------|
| How frequently does the IT department change its overall strategic direction? | <input type="text"/> | <input type="text"/> |

Please answer the following:

| | ___ years (enter a number) | and ___ months ago (enter a number) |
|---|-------------------------------|--|
| How long ago was the IT department's last major shift in its IS strategy? | <input type="text"/> | <input type="text"/> |

Please rate the extent to which each item describes how you view the IT department.

| | No Extent | Some Extent | Neutral | Great Extent | Very Great Extent |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Hierarchical | <input type="radio"/> |
| Procedural | <input type="radio"/> |
| Cautious | <input type="radio"/> |
| Power-oriented | <input type="radio"/> |
| Risk taking | <input type="radio"/> |
| Results-oriented | <input type="radio"/> |
| Creative | <input type="radio"/> |
| Challenging | <input type="radio"/> |
| Collaborative | <input type="radio"/> |
| Relationships-oriented | <input type="radio"/> |
| Sociable | <input type="radio"/> |
| Equitable | <input type="radio"/> |

Please rate the extent to which you agree or disagree with each of the following statements.

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Most people in the IT department have input into the decisions that affect them. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Cooperation and collaboration across functional roles is actively encouraged in our IT department. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department has an open door policy in which employees can seek the assistance and guidance of management above their immediate supervisor. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| There is a high level of agreement about the way we do things in our IT department. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our IT department's approach to doing business is very consistent and predictable. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Members of our IT department agree on critical issues and when we disagree, the department has mechanisms for reaching consensus. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please rate the extent to which you agree or disagree with each of the following statements.

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| The IT department in our organization is well funded. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our organization provides the necessary resources for strategic IT initiatives. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The organization ensures that IT initiatives receive the proper support to be successful. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please rate the extent to which you agree or disagree with each of the following statements regarding your CIO (please assess yourself if you are the CIO).

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Our CIO is an effective strategic leader within the organization. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our CIO is effective as a strategic business planner. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our CIO is an effective visionary within the organization. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please rate the extent to which each of the following describes the IT department.

| | No Extent | Some Extent | Neutral | Great Extent | Very Great Extent |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Our IT department is able to identify and acquire internal (e.g. within the department) and external (e.g. market) knowledge. | <input type="radio"/> |
| We are effective in developing new knowledge or insights that have the potential to influence product development. | <input type="radio"/> |
| We have effective routines to identify, value, and assimilate new information and knowledge. | <input type="radio"/> |
| We are effective in transforming existing information into new knowledge. | <input type="radio"/> |
| We can successfully exploit internal and external information and knowledge into concrete applications. | <input type="radio"/> |

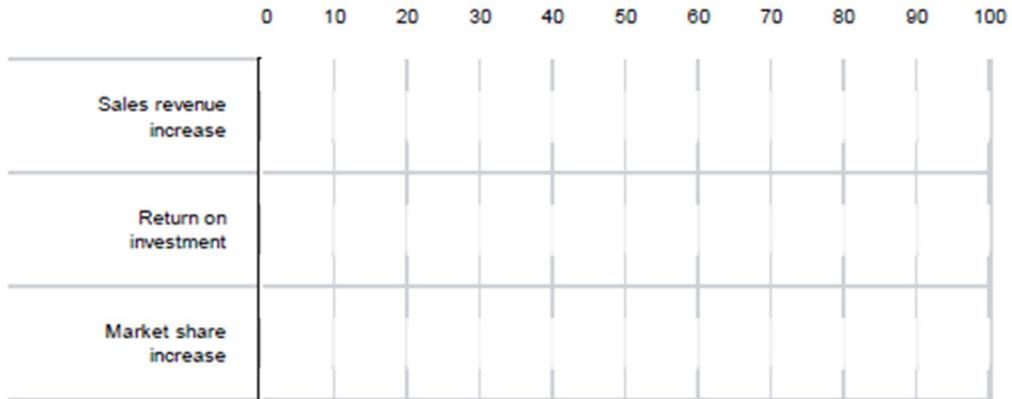
Please rate the extent to which the IT department is able to do each of the following.

| | No Extent | Some Extent | Neutral | Great Extent | Very Great Extent |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Quickly detect changes in customer demand. | <input type="radio"/> |
| Swiftly detect advances in technology that are relevant to the business. | <input type="radio"/> |
| Rapidly respond to advances in technology that are relevant to the business. | <input type="radio"/> |
| Promptly adjust to economic shifts that have the potential to impact the department. | <input type="radio"/> |

Please assess the extent to which IT has contributed to each of the following in your organization.

| | No Extent | Some Extent | Neutral | Great Extent | Very Great Extent |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Return on investment | <input type="radio"/> |
| Sales revenue increase | <input type="radio"/> |
| Market share increase | <input type="radio"/> |
| Cost savings | <input type="radio"/> |
| Operating efficiency | <input type="radio"/> |
| Process improvement | <input type="radio"/> |
| Customer satisfaction | <input type="radio"/> |

Approximately what percentage has IT contributed to each of the following in your organization?
(slide the bars to the desired percentage)



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Please rate the extent to which you agree or disagree with each of the following statements.

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| In our market, customer preferences change often over time. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Our customers tend to look for new products and/or services all the time. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The technology in our market changes rapidly. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Competitors in our market have been aggressively adopting advanced information technologies. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please assess your overall satisfaction with each of the following aspects of the IT department's performance.

| | Very Dissatisfied | Dissatisfied | Neutral | Satisfied | Very Satisfied |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| IT staff and services, e.g. with respect to cooperation received from, and communication with, IT personnel. | <input type="radio"/> |
| The information product, e.g. with the quality of online information and reports available. | <input type="radio"/> |
| End user knowledge and involvement, e.g. with respect to IT development in the organization. | <input type="radio"/> |

Please assess your satisfaction regarding the performance of your organization's CIO. (If you are the CIO, please assess how you believe your constituents feel about your performance.)

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| In general, I am satisfied with our CIO's job performance. (In general, I believe my constituents are satisfied with my job performance.) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Overall, I am satisfied with the progress our CIO is making. (Overall, I believe my constituents are satisfied with the progress I am making.) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Generally speaking, I am satisfied with the strategic direction our CIO is taking. (Generally speaking, I believe my constituents are satisfied with the strategic direction I am taking.) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

In which industry does your organization belong?

In which region is your organization headquartered or based?

How would you classify the size of your organization by number of employees?

How many employees work in the IT department?

What is your organization's approximate annual IT budget?

What percentage of your corporate budget is allocated to the IT department?



Please enter any comments you may have (optional):

May we contact you in the future for a possible follow up study? If so, please enter your email address. If not, please leave blank.

End of Survey

Thank you so much for taking your valuable time to participate in this study! Please click the next button (>>) at the bottom of the page to submit your responses.

APPENDIX B

Table B.1. Construct Items and Sources

Bureaucratic culture^a (Source: adopted from Wallach 1983)

1. Hierarchical [*dropped*]
2. Procedural
3. Cautious
4. Power-oriented [*dropped*]

Innovative culture^a (Source: adopted from Wallach 1983)

1. Risk taking
2. Results-oriented
3. Creative
4. Challenging

Involvement culture^b (Source: adapted from Denison and Mishra 1995; Surroca, Tribo, and Waddock 2010)

1. Most people in the IT department have input into the decisions that affect them.
2. Cooperation and collaboration across functional roles is actively encouraged in our IT department.
3. Our IT department has an open door policy in which employees can seek the assistance and guidance of management above their immediate supervisor.

Organizational support for IT^b (Source: adopted from Preston et al. 2008)

1. The IT department in our organization is well funded.
2. Our organization provides the necessary resources for strategic IT initiatives.
3. The organization ensures that IT initiatives receive the proper support to be successful.

CIO structural power (Source: adopted from Preston et al. 2008)

1. Is the CIO a formal member of your organization's Top Management Team (TMT)? Yes/No
2. How many reporting levels are between the CIO and the CEO?
 - a. 0 (the CIO reports directly to the CEO)
 - b. 1
 - c. 2 or more

CIO expert power^b (Source: adopted from Preston et al. 2008)

1. Our CIO is an effective strategic leader within the organization.
2. Our CIO is effective as a strategic business planner.
3. Our CIO is an effective visionary within the organization.

Table B.1. Construct Items and Sources (cont'd)

IS Innovator^b (Source: adapted from Chen et al. 2010)

1. Our IT department strives to be a leading IS innovator in our industry.
2. Our IT department seeks to explore new IS initiatives even if not all of these efforts prove to be highly profitable.
3. Our IT department responds rapidly to early signals concerning areas of opportunity for IS.

IS Conservative^b (Source: adapted from Chen et al. 2010)

1. Our IT department mainly seeks to gain efficiency by refining existing IS practices and technologies. [*dropped*]
2. Our IT department adopts promising IS innovations once these initiatives have been proven in our industry. [*dropped*]
3. IS innovations are carefully examined before they are chosen by our IT department.

IS Undefined^b (Source: adapted from Chen et al. 2010)

1. Our IT department does not have definitive long-term IS goals.
2. Our IT department does not have an articulated IS strategy.
3. Our IT department does not have a consistent pattern of behavior regarding IS.

IT unit absorptive capacity^a (Source: adapted from Pavlou and El Sawy 2006)

1. Our IT department is able to identify and acquire internal (e.g. within the department) and external (e.g. market) knowledge.
2. We are effective in developing new knowledge or insights that have the potential to influence product development.
3. We have effective routines to identify, value, and assimilate new information and knowledge.
4. We are effective in transforming existing information into new knowledge.
5. We can successfully exploit internal and external information and knowledge into concrete applications.

IT unit agility^a (Source: adapted from Tallon 2008 based on Overby et al.'s 2006 definition and description of agility)

1. Quickly detect changes in customer demand.
2. Swiftly detect advances in technology that are relevant to the business.
3. Rapidly respond to advances in technology that are relevant to the business.
4. Promptly adjust to economic shifts that have the potential to impact the department.

Table B.1. Construct Items and Sources (cont'd)

IS contribution to firm performance^a (Source: adopted from Preston et al. 2008)

1. Return on investment
2. Sales revenue increase
3. Market share increase
4. Cost savings
5. Operating efficiency
6. Process improvement
7. Customer satisfaction

Note: Scales are a: 5-point scale ranging from (1) no extent, to (5) very great extent; b: 5-point scale ranging from (1) strongly disagree, to (5) strongly agree

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