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A structural equation model of the factors associated with influence and power of IT departments and their relationship to firm's IT orientation and business performance

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2010

Abstract

A Structural Equation Model of the Factors Associated with Influence and Power of IT Departments and their Relationship to Firm's IT Orientation and Business Performance

by

Raghu V. Kowshik

M.B.A, Texas Christian University, 1997

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Information Systems Management

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Abstract

Although few firms can function without an information technology (IT) department, senior executives often consider IT as secondary. Historically, studies have found IT departments to have low influence and power status compared to other departments. Few, if any, studies have investigated what factors contribute to this subservient position. Three research questions that inspired this study regarding the IT department's influence and power included factors that shape the IT influence and power, the consequences for the firm's IT orientation and business performance, and how firm's IT orientation affects business performance. This quantitative study explored the notion that accountability, innovativeness, customer connectedness and partnering with other departments positively affect the IT department's influence and power. A synthesis of resource dependence and strategic contingency theories framed the theoretical basis for the structural equation model analyzed in this study. Responses from a Web panel of 349 anonymous, voluntary senior managers of firms operating in various industry types provided the data. Analysis results showed that accountability, innovativeness, and partnering with other departments positively affect the IT department's influence and power. Also, the firm's IT orientation, more so than IT department's influence and power, positively affects business performance. Results help IT executives to become more influential and enhance their ability to participate in their firm's strategic decisions. From social change perspective, influential IT managers can affect strategic decisions regarding social programs, implement new IT tools to do more with less, and new ways of distributing critical information and resources to enhance the speed of response when and where needed.

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Dedication

I dedicate this study to my wife, Kamala. I would not have accomplished this dream without her forbearance and support. More than three years ago, my children, Samaresh and Nikhil, said, “Dad, you should do PhD”. I dedicate this work to both of them for believing in me.

Acknowledgments

I express my sincere thanks to my dissertation committee for their support. This includes Dr. Lee W. Lee (Chair), Dr. Robert Kilmer (Committee Member), and Dr. Robert Haussmann (University Research Reviewer). My chair and faculty mentor Dr. Lee not only directed my doctoral journey to its successful completion but also enriched my transformation from a practitioner to a scholar practitioner. Dr. Kilmer's technical advice on the statistical and methodological aspects throughout the dissertation writing process was invaluable. Dr. Haussmann's thorough examination of my proposal and the final dissertation have been instrumental in producing a high-quality dissertation.

I convey my sincere thanks to all my friends and colleagues, too many to list here, who encouraged and helped as I conceptualized my dissertation research. Specifically, Peter Sorenson, Rajeev Chowdhry, and Evan Zhang for listening to my views on the dynamics of influence and power and leadership styles in organizations; Jim Puzar, Brad Vandehey, Dave DeForest, and Myckel Haghnazari for their moral support and help during the pilot study. My fellow students David Finch, Kristen Baden, Kendra Hensley, and Albert Cruz for their conversations from time to time making my experience as a student at Walden a great one.

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Chapter 1: Introduction to the Study

Background

Information technologies have brought about extraordinary returns for some organizations and have strengthened the activities of other organizations. In today's Internet-based society, information is power. The IT department in a firm owns and controls the technology that produces the information required by the firm. Even in cases where the IT infrastructure may be outsourced to a third-party service provider or a leasing company, the ultimate ownership of the service rests with the IT department of the company. Most firms cannot function without an IT department; the activities performed by the IT department are cross-functional and involve products, processes, and people interconnected strongly with the firm's overall business strategy (Lefebvre, Mason, & Lefebvre, 1997, p. 857). Also, the IT department's activities are both strategically and operationally critical to present-day firms (Bharadwaj, 2000). This implies that the IT department exerts influence on the organization (Reich & Benbast, 2000). However, while the IT systems and the activities performed by the IT department can be critical to a firm's operations, the IT department is often considered secondary (Kaarst-Brown, 2005). This research analyzed the factors that contribute to the IT department's influence within the firm and determined what the IT department can do to overcome this subservient treatment. Specifically, this study addressed the factors that determine the IT department's influence within a firm and the consequences of IT department's influence on the firm's IT orientation and business performance. To this end, the study specifies a complete model consisting of the IT department's influence as the dependent variable and IT department's capabilities such as accountability, innovativeness, customer connectedness, and partnering with other departments as the antecedent variables. This model helps senior leaders and practitioners in organizations to increase the influence and, therefore, the status of their IT departments.

Influence and power in organizations is a vague concept and may have a multitude of meanings and interpretations depending upon the context. Some authors consider influence and power as two distinct concepts, that is, power as latent power and exercised power as influence directed at subordinates, peers, and superiors (Lines, 2007). Other authors consider influence and power behavior as one integrated concept (Lines, 2007). The reasoning behind this view appears to be that power is not useful unless it is exercised (Lines, 2007; Pfeffer, 1981; Pfeffer, 1992; Pfeffer & Salancik, 2003). In this department level study, this researcher followed the latter perspective because, in the context of departments, in a firm, power is relational (Clegg, 1989); it exists as a capacity for action embedded in the social relations (Doolin, 2004). Power exists at the department level in an organization only when exercised, only when put into action (Doolin, 2004). Therefore, from a conceptual perspective, influence and power are used as a single concept in this study.

This study sought to determine the factors that affect IT departments' influence and power. To provide a theoretical foundation, two schools of thought have been used in this study; one is the resource dependence model and the second is the strategic contingencies model.

Information technology is a resource that people in today's firms' value because of its ubiquity and utility to do business efficiently and effectively. It appears to be expected that, as the caretakers of information technology, the IT departments would be able, if they choose, to extract rewards from other departments who depend on it (Markus & Bjorn-Andersen, 1987). This reasoning reflects a theory of power known as "resource dependence" (Pfeffer & Salancik, 2003, 258).

Another theory explains the power of the organizational subunit, such as the IT department, in terms of "strategic contingencies," whereby IT department's power results from a combination of three factors: (a) The ability to cope with uncertainty: Can the IT department deal with environmental or task uncertainty faced by other departments or the organization as a whole? (b) Indispensability of this ability to cope with uncertainty: Is the IT department's coping ability unique and irreplaceable? (c) Influence on the subunit's or organization's work flow (Hickson, Hinings, Lee, Schneck, & Pennings, 1971). Both the resource dependence and strategic contingencies approaches have been used in the current study.

Although previous research (e. g., Lucas, 1984; Saunders & Scamell, 1986) has shown that the IT departments do not have power in firms, it is not clear if there are any specific antecedents that contribute to the perceived influence and power of the IT department regardless of the industry in which the firm operates. These studies have largely approached the study of the IT department's influence and power from strategic contingency and resource dependence perspectives, which are firm- and context-specific. The current study is an attempt to understand the status of the IT department's influence and power as the endogenous (dependent) variable, within organizations, from the perspective of situational factors, such as accountability, innovativeness, customer connectedness, and partnering with other departments as the exogenous (independent) variables, which are more appropriate for group, subunit, or department level studies. Understanding the relative influence within firms helps to explain organizational decisions or behaviors (Morgan, 1996). Also, the influencing capability of the IT department (the exogenous or independent variable), may serve as the positive social energy that facilitates organizational change and promotes a firm's business performance which is the endogenous or dependent variable (Lawrence, Mauws, Dyck, & Kleysen, 2005; McClelland & Burnham, 2003). The intrinsic benefit of validating the perspectives of this study is that it would allow IT management practices to be defined for a given level of IT department's influence and power on a firm's business performance.

Chief information officers (CIOs) and IT managers must know what factors contribute to the enhancement of the IT department's influence and power within the firm so that they can focus on developing those capabilities. The importance of the IT department to the firm, including justification of its operational costs and share of the budget, depends on the IT department's effect on the firm's business performance (Love, Ghoneim, & Irani, 2004). Some researchers (e.g., Saunders & Scamell, 1982) have found power differences across industry types. It is also possible that the power relationships may be confounded with other variables, such as CEOs' background. The current study surveyed respondents across industry types, to account for potential effects, collected other categorical data including CEOs' background and industry and firm characteristics such as type of competitive strategy. However, the primary focus of the study was not the confounding effects of these variables. Therefore, no specific hypotheses linking these variables to the core constructs of the research model were proposed.

In the following section, the statement of the problem is derived from current research. Relevant literature is cited to support the problem statement. A more detailed discussion of the previous and current research is presented in chapter 2.

Statement of the Problem

The problem this study addresses is the lack of understanding of what factors affect the IT department's influence within the firm. While previous research studied the relative influence level of the IT department within firms and concluded that it was low (e.g., Lucas, 1984; Lucas & Palley, 1986; Saunders, 1981; Saunders & Scamell, 1982; Saunders & Scamell, 1986), the factors that contributed to such a low level of influence was not their focus. This is a gap in understanding. Also, whether such factors are common across various industry types is also of interest to this researcher. IT departments that are not influential may be denied the opportunities to participate in firm-level strategic decision-making; consequently, they may be relegated to a subservient position in the firm. At such firms, the IT department does not have a seat at the CEO's table, so to speak. According to Kaarst-Brown (2005), "many IT executives are still not at the table because they are not viewed equal to their business peers. Even elevating IT executives to C-level management and giving them the title of CIO do not guarantee that they are accepted and invited to high-level business meetings" (p. 287). In most publicly traded large corporations, the top management team (TMT) is composed of the heads of finance, marketing, engineering, operations, and HR functions. Consequently, these departments participate in, contribute to, and develop the firm's business strategy along with the CEO. The IT department and its head, the CIO, is not necessarily a member of the TMT. The business vision and strategy developed by the CEO and his or her TMT is merely passed on to the IT department with the expectation that the department will execute the tasks that support the vision and strategy. This leaves the IT department undervalued and underutilized (Capellá, 2005) and is a significant concern for the IT profession, including individual contributors, managers, and executives. Such concerns are evident from the many surveys conducted by the trade publications and magazines such as *The CIO, eWeek,* and *Information Week*. The number and frequency of such surveys suggests that the IT domain is constantly seeking affirmation and reassurance of its importance. These concerns stem from the fear that lack of the IT departments' influence and power at the top management level "may increase the risks that the agenda for IS will be shaped by other, less knowledgeable sources" (Fiegener & Coakley, 1995, p. 58).

Purpose of the Study

This study sought to address three issues with regard to IT department's influence and power within the firm. First, it sought to investigate the level of the IT department's influence and power within the firm. Second, it delved into the importance of the determinants of IT department's influence and power within the firm. Specifically, it focused on situational determinants and excluded characteristics of individual managers, such as charisma (Pfeffer, 1992) and individual bases of power (French & Raven, 1959). Third, assuming a high level of IT savvy within the firm, this researcher aspired to gain a deeper understanding of the interplay between IT department's influence and power and IT orientation (IT savvy) within the firm. Consequently, this study investigated the effects of IT department's influence and power and IT orientation (IT savvy) on firm performance.

Another important reason for this study is that this researcher has worked in the manufacturing industry for over 25 years and specifically in the IT departments for over 12 years. Thus, this researcher has a vested interest in analyzing the antecedents of the IT department's influence within the firm and the effects of this influence on a firm's IT orientation and business performance.

Nature of the Study

This scientific study sought to identify and test empirical generalizations. Researchers and practitioners have asserted that the IT department within firms does not have influence and power. This is based on the observation of organization structure charts of companies in different industries that the IT department does not report directly to the ultimate position of power namely the CEO and, therefore, has low power status. Researchers have conducted studies to confirm the relationship between reporting relationship or position in the organization structure and the relative level of influence and power. For example, Lines (2007) found a positive and direct relationship between a change agent's position power and the change agent's potential for success in implementing a change. The IT department is viewed in organizations as an enabler of change and a change agent. While the relative positioning of IT in the organization structure may depend on the organization's needs and the IT savvy of the executive who is willing to take IT under his or her department, the IT leaders' and the CIOs' concern is the decision making authority granted to them. In many instances, the location of the IT department in the organizational structure of the corporation is such that the CIO alleges lack of "sympathetic attention at a sufficiently high level" (Mautz, Merten, & Severance, 1983, p. 46). For example, if the IT department is located in the CFO's department, the CFO may delegate the IT oversight responsibility to the controller; if the controller delegates the systems oversight responsibility to an assistant controller, the position of the IT department within the company is less likely to have the power to influence people who can make the best case for the IT department (Mautz, Merten, & Severance, 1983).

While this study did not reexamine the previous conclusions (e.g., Lucas, 1984; Saunders, 1981) that the IT departments' influence and power is low, it identified and tested causes for the influence and power status of the IT department within the firm. To this end, this study is also analytical in nature. Following the traditions of mathematical science including classical geometry with its proofs from postulates, to answer the question what causes the relative level of influence and power, this study postulated that accountability, innovativeness, customer connectedness, and partnering with other departments within the firm are capabilities which can have a positive effect on the IT department's influence level. This study also postulated that an influential IT department has a positive effect on the firm's IT orientation (IT savvy) and business performance.

To obtain proof and validate these propositions, data was collected from respondents randomly chosen from a population of senior executives of firms operating in several types of industries. To this end, this study is quantitative in nature employing survey method for data collection, and structural equation modeling as the statistical technique for analyzing the data and interpreting the results of the analysis to support the propositions. In chapter 3, the details of the quantitative approach are covered.

Research Questions

Over the past decade, the role of IT in increasing corporate value has been the topic of extensive research. Literature in organizational theory, management strategy, social and behavioral sciences has underscored the importance of acknowledging the existence of influence and power as a foundation for understanding how managers make decisions within organizations (Hinings, Hickson, Pennings, & Schneck, 1974; Perrow, 1970; Salancik & Pfeffer, 1974). However, there has been little examination of the level and determinants of the IT department's relative influence within the firm. Added to this, the assertion that IT doesn’t matter (Carr, 2003) created contentious debates in corporate boardrooms. Carr (2003) argued that IT was pervasive, increasingly inexpensive, and accessible to all firms thus making it a commodity and, therefore, it could not provide any advantage.

Bhatt and Grover (2005) argued that Carr (2003) failed to distinguish between the ability to manage the IT assets and the IT artifact of commodity infrastructure, which he compared to the railroads and telegraphs as standardized infrastructure available to all. Proponents of this line of thinking have argued that managing IT is a capability that can provide competitive advantage to organizations. Firms invest heavily in IT and the capability to manage this investment is not uniform across the industry and the organizations. This unequal management capability leads to a differential business value to firms by improving organizational efficiency and effectiveness (Bhatt & Grover, 2005).

Pfeffer and Salancik (2003) have argued that influence and power come from the capability to manage the significant resources of a firm. However, there is no empirical evidence showing that IT department's capability to manage significant corporate investments makes it influential within the firm. Even though the IT department manages significant corporate resources, particularly in large for-profit, publicly traded firms—such as the expensive IT infrastructure equipment and human resources specialized in developing and implementing IT solutions—researchers (e.g., Lucas, 1984; Saunders & Scamell, 1982) have found that it is relatively less influential within the firm.

There is scarce research on the topic of IT department's influence and power within the firm. The importance of studying these issues is increasing, given the global nature of organizations, the declining economic trends, and the consequent demands for a simultaneous centralization and decentralization of IT to reduce cost and increase efficiency and effectiveness in the international landscape. Further, because of its ubiquity and low-cost if indeed the world view leans towards Carr's (2003) assertions, then the capability to manage this pervasive resource has even greater implications for organizations and IT department leaders.

Based on the notion that IT infrastructure is not a competitive weapon, rather, what is important is, how it is managed, it is relevant for IT researchers, practitioners, and senior leaders to develop an understanding of the level and determinants of an IT department's relative influence within the firm. This researcher argues that this is a significant gap in understanding, because it is not known what factors might lead to variations in the IT department's role. This has led to the following three research questions:

1. What factors shape the IT department’s influence and power within the firm?
2. What are the consequences of the IT department’s influence and power for the firm’s IT orientation (IT savvy) and the firm’s business performance?
3. How does a firm’s IT orientation (IT savvy) affect the firm’s business performance?

Theoretical Base

In this section, a theoretical base is established for the study by bringing together a framework of theory and practical research to guide the development of research model and hypotheses. First, a theoretical framework is presented. It provides guidance for exploring the extant literature to establish a theoretical base and develop the research model. Next, the development of the research model and hypotheses are described.

Theoretical Framework

Researchers in IT have advocated for the exploration of the dynamics of influence and power in organizations in order to develop a greater understanding of the particular constructs and mechanisms that motivate the concerns of IT researchers and practitioners alike regarding the IT department and its leaders’ role and importance in organizations (Hinton & Kaye, 1996; Jasperson, Carte, Saunders, Butler, Croes, & Zheng, 2002; Karahanna & Watson, 2006; Markus & Bjorn-Andersen, 1987; Saunders, 1981). Scholars emphasize (e. g., Jasperson, Carte, Saunders, Butler, Croes, & Zheng, 2002; Karahanna & Watson, 2006) that while researchers may apply organization, management, and leadership theories to study IT management phenomena in research, the theories chosen must address the IT practitioner concerns that stem from the individual characteristics of the IT department and its management (Preston, Chen, & Leidner, 2008). Following these guidelines, strategic contingencies theory and resource dependence theory were employed as the foundational theories for the current study. Further, these two theories were synthesized with previous IT management and organization literature as the theoretical basis to develop a research model, which includes the hypothesized relationships in the model. This researcher followed the notion that the strategic contingencies theory of intraorganizational power is a suitable lens (Lucas, 1984; Saunders, 1981; Saunders & Scamell, 1982) through which to understand the factors affecting the IT departments' influence and power within firms and the consequences of that departmental influence and power for organizations. In addition, the resource dependence theory in the power and politics literature was helpful in identifying the factors that affect IT departments' influence and power. Also, the contemporary empirical literature in the IT management and organization domain offered further support for the research model and the study's hypotheses. Together, the foundational theories and the empirical research literature provided theory-based justification for the operationalization of the constructs in this study.

The preceding discussion illuminated the theoretical underpinnings and their application in this study. These ideas are depicted in a theoretical framework shown in Figure 1. The three rectangles in the middle labeled Antecedents, IT Department's Influence and power, and Consequences describe the notion that (a) there are some antecedents that affect the IT department's influence and power within the firm, and (b) the IT department's influence and power has consequences for the firm. The rectangle at the bottom and the top describes the theoretical basis used for the assertions that perspectives from (a) strategic contingencies and resource dependence theories offer a theoretical foundation and (b) current literature from IT management and organization research offer support for the research model and hypotheses.

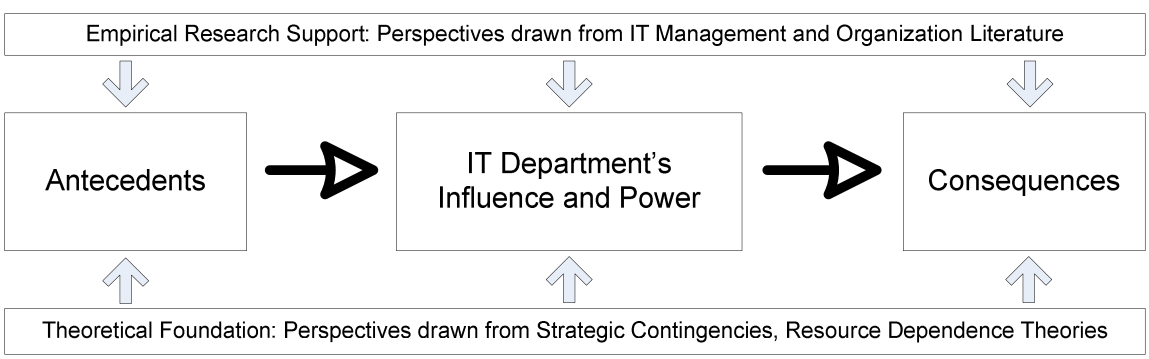

Figure 1. Theoretical framework.

Research Model and Hypotheses

Guided by the preceding discussion and the resulting theoretical framework, the research model, shown in Figure 2, was developed; it puts the IT department's influence in a nomological network that leads to the IT department's contribution to a firm's IT orientation and business performance. Hypotheses H1 through H7 were derived from the literature to test the theoretical assumptions implied by the research model.

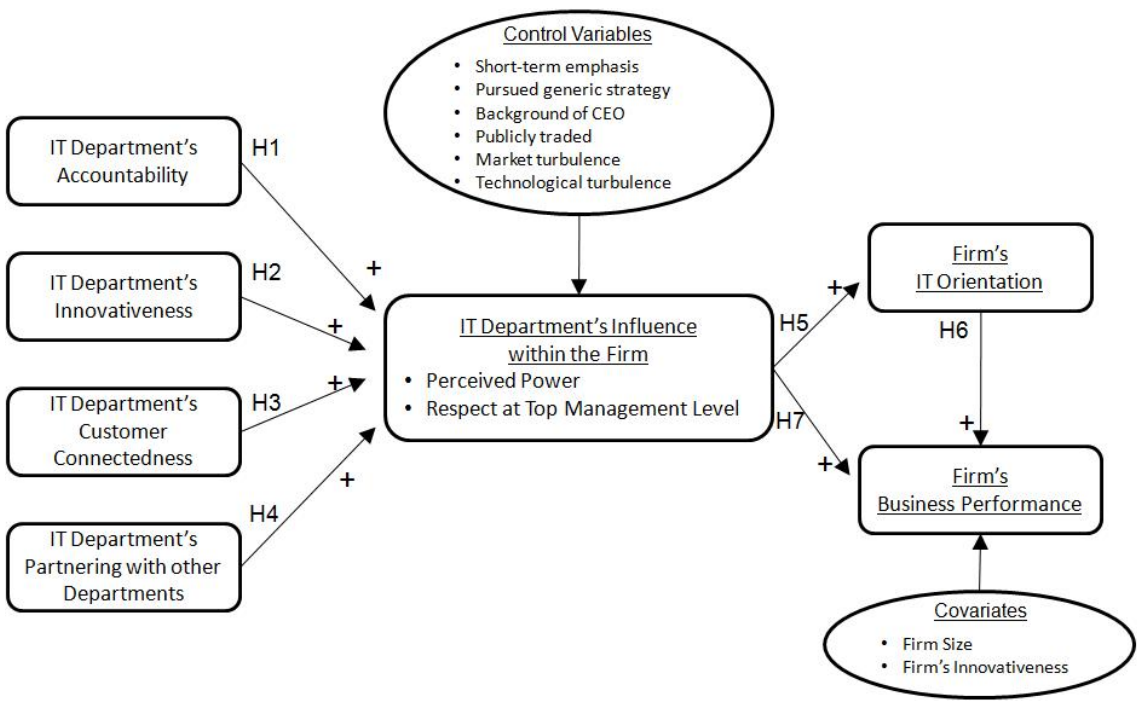

Figure 2. Research model.

As depicted in Figure 2, the antecedent exogenous variables affect, or *cause*, the IT department's influence and power. Also, the situation could be reversed just as well, that is, the IT department's influence and power may *cause* the IT department to have greater innovativeness, customer connectedness, and the capability to partner with other departments. Although this researcher found theoretical foundation and support for the causal direction (e.g., Bhatt & Grover, 2005; Katz, 1993; Lacity, Willcocks, & Feeny, 1996; Pfeffer & Salancik, 2003; Peppard, 2001), the theory in this area is not well developed. The causal flows depicted by arrows from the exogenous to endogenous constructs shown in Figure 2 were evaluated in this study using cross-sectional, self-reported data provided by study participants and structural equation modeling (SEM) techniques. However, scholars in SEM (e. g., Netemeyer & Bentler, 2001) caution that "deriving causal inferences from cross-sectional data is fraught with risk" and correlational data does not conclusively support causality (Chin, Peterson, & Brown, 2008, p. 295). According to Kline (2005), SEM is not an analytical method for testing causality. Rather, it allows testing alternative models that may predict different causal relationships, the evaluation of the significance of the estimated parameters, and the goodness of fit of the overall model. Notwithstanding these guidelines, from a causal directional perspective, which comes first - the antecedent variables or the IT department's influence and power? Although one might resist the temptation to compare this to the age old riddle—"Which comes first, the chicken or the egg?"—it is in fact a key question that researchers face in many disciplines. If, for example, one assumes that innovativeness of the IT department leads to the relative level of influence and power of that department, then the influence and power of the IT department toward another department within the firm might be affected by changing the other departments' perceptions of the IT department. This can be done either through an actual change in IT departments' innovativeness or through communication aimed at changing expectations, perceptions, or both. If the IT department's influence and power leads to the innovativeness of that department, then changing the other departments' experiences with the IT department may change the IT department's innovativeness. However, there is no empirical investigation supporting these points. Therefore, in this study, the direction of causality was assumed to be in one direction as depicted in Figure 2. The question of which variable is the driving force is not answered by this study. This researcher positions the issue of the relationships between the antecedents and the IT department's influence and power, as evidenced by the results of this study, in the broader context of understanding the nature of influence and power of a subunit or department in an organization and how that influence and power is affected by the antecedents.

The research model depicted in Figure 2, and the relationships between the variable constructs, are complex. To clarify the relationships and hypotheses depicted in the research model, the overall model is broken into three subordinate models.

The subordinate model 1 is depicted in Figure 3, showing the relationships between the IT department's influence and the antecedent variables; the relationship between each antecedent variable and the dependent variable *IT Department's Influence* is hypothesized to be a positive effect. The higher level of each antecedent variable characteristic is postulated to result in a higher level of the dependent variable *IT Department's Influence*.

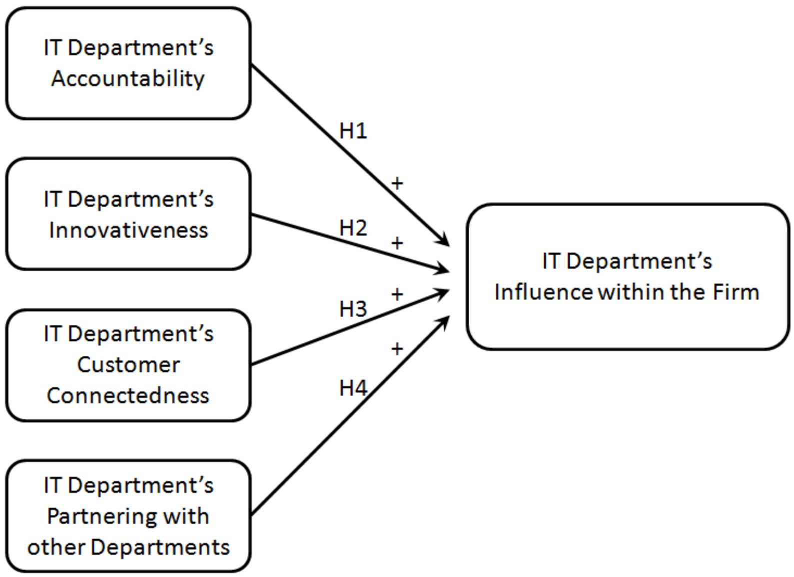

Figure 3. Subordinate model 1: IT department's influence and antecedents.

Model 1 addresses the research question, what factors shape the IT department's influence and power within the firm. Based on the perspectives of departmental influence and power drawn from a synthesis of resource dependence theory, strategic contingencies theory, IT management and organization literature, this study identified *accountability, innovativeness, customer connectedness,* and *partnering with other departments* within the firm as the key factors that have an effect on the degree of IT department's influence within the firm thereby proposing hypotheses H1–H4 listed below.

Hypothesis H1: accountability is an antecedent affecting the IT department's influence and power within the firm.

- $H1_0$: There is not a positive relationship between accountability and the IT department's influence and power within the firm.
- $H1_a$: The accountabilit*y* of the IT department is positively related to the IT department's influence and power within the firm.

Hypothesis H2: innovativeness of the IT department is an antecedent affecting the IT department's influence and power within the firm.

- $H2_0$: There is not a positive relationship between innovativeness and the IT department's influence and power within the firm.
- $H2_a$: The innovativeness of the IT department is positively related to the IT department's influence and power within the firm.

Hypothesis H3: customer connectedness (customer connecting capability) of the IT department is an antecedent affecting the IT department's influence and power within the firm.

- $H3_0$: There is not a positive relationship between customer connectedness and the IT department's influence and power within the firm.
- $H3_a$: The customer connectedness of the IT department is positively related to the IT department's influence and power within the firm.

Hypothesis H4: collaboration (capability to partner, collaborate, with other departments within the firm) of the IT department with other departments within the firm is an antecedent affecting the IT department's influence and power within the firm.

- $H4_0$: There is not a positive relationship between collaboration and the IT department's influence and power within the firm.
- $H4_a$: The collaboration of the IT department is positively related to the IT department's influence and power within the firm.

The subordinate Model 2 is depicted in Figure 4 showing the positive effect of IT department's influence and power on the firm's *IT Orientation* and *Business Performance* constructs. This model addresses the research question, what are the consequences of the IT department's influence and power for the firm's IT orientation (or IT savvy) and the firm's business performance.

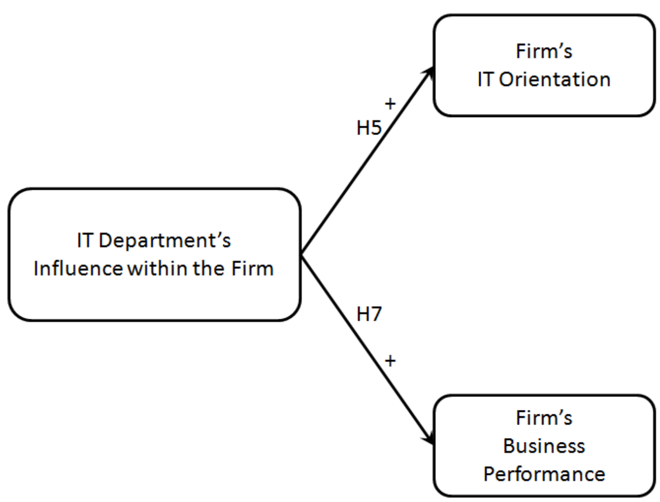

Figure 4. Subordinate model 2: IT department's influence and power effects on IT orientation and business performance.

This study hypothesized that the IT department's influence and power within the firm makes a dual contribution at the firm level by affecting the firm's IT orientation and business performance. This assertion is summarized by the following two hypotheses H5 and H7.

Hypothesis H5: There is a predictive relationship between IT department's influence and power (independent variable) within the firm and the IT orientation (IT savvy) (dependent variable) of the firm.

- $H5_0$: There is not a positive relationship between the IT department's influence and power within the firm and the firm's IT orientation.
- $H5_a$: There is a positive relationship between the IT department's influence and power within the firm and the firm's IT orientation.

Hypothesis H7: There is a predictive relationship between IT department's influence and power (independent variable) within the firm and the firm's Business performance (dependent variable).

- $H7_0$: There is not a positive relationship between the IT department's influence and power within the firm and the firm's Business performance.
- $H7_a$: IT department's influence and power within the firm is positively related to the firm's business performance.

The subordinate Model 3, depicted in Figure 5, shows the positive relationship between the IT orientation and Business Performance constructs. This model addresses the third research question, how does the IT orientation (IT savvy) of a firm affect the firm's business performance.

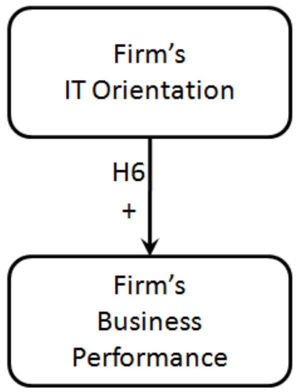

Figure 5. Subordinate model 3: IT orientation and business performance.

This study also hypothesized that the degree of IT oriented culture within the firm contributes to firm's business performance and proposes hypothesis H6.

Hypothesis H6: There is a predictive relationship between IT Orientation (IT savvy) (independent variable) within the firm and the firm's Business performance (dependent variable).

- $H6_0$: There is not a positive relationship between the firm's IT Orientation and the firm's Business performance.
- $H6_a$: The firm's IT orientation is positively related to the firm's Business performance.

As stated previously, SEM was used to test the hypotheses. The null hypothesis in SEM is the hypothesized model. The statistical parameters of the hypothesized model indicate the presence or absence of causal paths between the variables (Hoe, 2008). A low *p*-value (that is, one close to zero) means that the null hypothesis is rejected with a low probability of being wrong in reaching that conclusion (MacLean & Gray, 2001). The causal paths depicted in the research models were evaluated in terms of statistical significance and strength using standardized path coefficients between -1 and +1. Based on an α of 0.05, the test statistic generated from SPSS/AMOS should be greater than ±1.96 to indicate that the null hypotheses can be rejected. The rejection of the null hypotheses means that the structural coefficient is not zero (Byrne, 2001).

In the following sections, the research model depicted in Figure 2, and the three subordinate models are described in detail. First, the definitions of variable constructs are presented. Then, the linkages between the constructs and the research hypotheses are developed. Finally, a theoretical justification and support is provided regarding the measurement of the variable constructs.

Definition of Variables

The following sections define the variables examined and describe the hypotheses. These variables were operationalized by the scales included in the "IT department's role in organizations" survey used for this study (see Appendix B).

The psychometric properties of the measures used in the survey are described in chapter 3.

As depicted in the research model, in Figure 2, there are four antecedent variables: accountability, innovativeness, customer connectedness, and partnering with other departments. These antecedents are exogenous (independent) variables that are hypothesized to affect the endogenous (dependent) variable IT Department's influence and power. However, the antecedents are not definitional components of the endogenous (dependent) variable. Additionally, the dependent variable IT Department's influence and power also acts as an independent variable by affecting the dependent variables IT orientation and Business performance.

Accountability: It is a perspective about IT department's capability to act in a consultative role within the firm. The IT management practice of accountability is characterized by simplicity and information sharing (Seiling, 2001). It keeps the lines of communication open and other departments do not feel patronized or threatened by the IT department (Seiling, 2001). This capability makes the IT department more credible with other departments within the firm.

Innovativeness: It is the IT department's ability to be creative in problem solving and helping other departments to succeed. It is the "willingness to try out any new information technology" (Agarwal & Prasad, 1998, p. 206). The IT department is generally comprised of technically savvy employees with creative abilities. Innovativeness is their innate predisposition to explore, to find out new ways of doing things (Hirschman, 1980; Midgley & Downing, 1978). The notion is to use the skills to be creative in ways to help other departments solve their problems. This capability also enhances the consultative role, thereby suggesting that *accountability* and *innovativeness* are correlated.

Customer connectedness (Customer connecting capability): It is a perspective about IT department's awareness of the firm's customers' needs. In today's Internet-based society, business-to-business or business-to-consumer relations are established through electronic media and the IT department is central to implementing these connections. Therefore, both internal and external business partners have to interact with the IT department to set up these connections. Consequently, the IT department comes to socialize with the partners during the implementation process and thus develop unique customer perspectives. This characteristic gives the IT department a special status in the firm and the department is called upon to help other departments to help the customer connections. Thus, customer connectedness allows the IT department to act in a consultative role. Each consulting opportunity also challenges the IT department to bring out its innovativeness to solve problems faced by the firm and the customer. This suggests that customer connectedness is correlated with accountability and innovativeness.

Collaboration with other departments: Collaboration or partnering with other departments is a perspective about working with other, non-IT departments within the firm.

IT department's influence and power: The IT department's influence and power is the endogenous (dependent) variable and is a composite of two concepts: *perceived power* and *respect at the top management level*. While the antecedents have an effect on the IT department's influence and power, perceived power and respect at the top management are the definitional components of IT department's influence and power. This means that higher perceived power and respect at the top management is indicative of high levels of the IT department's influence and power; the converse is also true. Similarly, a low level of IT department influence and power is indicative of low levels of perceived power and respect at top management.

IT orientation and Business performance**:** These are endogenous (dependent) variables. The firm's *IT orientation* is a perspective about the IT savvy of employees within the firm. Employees who are IT savvy feel more comfortable working with information technologies. They are not technical experts, but they know how to use technology to enhance their performance and, in turn, enhance the performance of the firm. They are aware of the technology solutions available in the market. They can define their needs, and they drive IT investment decisions. While the influence and power is a department level variable in this study, the IT orientation is a firm level variable.

The *business performance* perspective in this study is not econometric. It is perceptually comparative, not numerically comparative. An example of this perception measure included in the survey is: "My Company did better this year compared to last year." In information technology studies, business performance is frequently examined in financial terms such as cost ratios (Nakata, Zhu, & Kraimer, 2008, pp. 489-490). However, some researchers have argued that multidimensional construct is a more appropriate representation of business performance (Chan, 2000; Eskildsen, Westlund, & Kristensen, 2003). Therefore, in this study, business performance is comprised of market performance and financial performance. Market performance is a perception of the relative effectiveness in the areas of customer retention, market share, and new product performance, whereas financial performance is a perception of the relative effectiveness indicated by sales revenue and profits.

The linkages between the antecedents and the dependent variables are discussed in the following sections. For each linkage, a hypothesis was developed based on perspectives drawn from current and past literature. Each hypothesis statement is a causal assertion of this researcher. For example, in the context of this study, the assertion that A is positively related to B implies that A causes B to increase. In other words, by increasing A one can increase B. Although the negative direction of this relationship is not explicitly stated as a causal relationship, the positive assertion implies that the negative assertion is true: by not increasing A, one experiences that B is also not increasing.

Model 1 Hypotheses: Antecedents of IT Department's Influence and Power

Drawing support from IT management literature, the linkage between each antecedent variable and the IT department's influence and power were developed.

The following sections present the theoretical assertion for each linkage as depicted in the subordinate Model 1 shown in Figure 3.

Linkage Between Accountability and IT Department's Influence and Power

In many firms, the IT department and the CIO have difficulty justifying their expenditures in terms of direct return on investment. As Love, Ghoneim, and Irani (2004) state, "The high expenditure on IT/IS, the growing usage that penetrates to the core of organizational functioning, together with disappointed expectations about IT/IS impact, have all served to raise the profile of how IT/IS investments can be evaluated" (p. 312). Accountability also involves a determination of the effects of IT activities on the value of the firm. Often senior executives of firms believe that IT has failed to deliver competitive advantage and consider IT service providers as more efficient than the internal IT departments (Lacity, Willcocks, & Feeny, 1996). Therefore, many senior executives view IT as a necessary cost that needs to be minimized. In a study conducted by Lacity, Willcocks, and Feeny (1996), the CEO of U.S. petroleum, gas and chemicals conglomerate expressed his frustration with IT:

> All we see is this amount of money that we have to write a check for every year. Where is the benefit? IS says, "Well, we process data faster than we did last year." So what? Where have you increased revenue? All you do is increase costs, year after year, and I am sick of it. All I get are these esoteric benefits and a bunch of baloney on how much technology has

> advanced. Show me where you put one more dollar on the income statement. (Lacity, Willcocks, & Feeny, 1996, p. 13)

In addition to the consultative role of the IT department, the meaning of accountability, as used in this study, is the IT department's ability to translate its activities into financial outcomes instead of fostering a "perception that IT is a cost burden" (Lacity, Willcocks, & Feeny, 1996, p. 13). The importance of such accountability has been acknowledged widely (Katz, 1993). There is a positive relationship between accountability and the IT department's influence and power within the firm. For example, consider a case where the IT department in a firm implements customer relationship management software. The sales department of the firm uses this software application to maintain data on prospective customers, the sales pipeline, track successful and unsuccessful sales leads, and forecast sales revenue. Top management is happy that the sales department is very efficient in its sales management process resulting in increased revenue for the firm. Since the sales department is bringing in higher levels of revenue, it may enjoy higher levels of influence and power and respect at the top management level within the organization. However, the IT department, which provided this tool, is treated as a service provider who implemented the software and not as a partner of the sales department in increasing the firm's revenue. If the IT department can translate the implementation activities in terms of the sales revenue, in terms of how the IT department is contributing to the revenue generation process, top management would perhaps be more satisfied with IT. This would in turn increase the IT department's participation in a firm's strategic decision making processes thereby increasing its influence and power. Therefore, this researcher expected the following:

- H1: The accountability of the IT department is positively related to influence and power of the IT department within the firm.

Linkage Between Innovativeness and IT Department's Influence and Power

In today's enterprises, information technology is ubiquitous and is the source of many innovative ideas that can help generate revenue (Grover, Henry, & Thatcher, 2007). Many empirical studies confirm that innovativeness is one of the most important business drivers. Miller, Miller, and Dismukes (2006) argued that, in the future, information will be the driving force of innovation be it incremental, next-generation, or radical innovation. Being the engine that enables the information, IT will have a significant impact on the ability of the organization to pursue innovations (Miller, Miller, & Dismukes, 2006). The IT department's innovativeness plays a key role in designing, developing, implementing, and installing information systems and software applications in order to automate information management associated with innovation. New technology, including the semantic web (Berners-Lee, Hendler, & Lassila, 2001; Hendler, 2005), integrated, heterogeneous data warehousing centers, and advanced software for managing project work groups (Miller, Miller, & Dismukes, 2006), are some of the innovative tools that have a significant impact upon the information landscape.

Resource dependence theory defines an organization as a coalition of participants (Pfeffer & Salancik, 2003). Those coalition participants who provide capabilities that are needed or desired by other organizational participants come to have more influence (Pfeffer & Salancik, 2003, p. 27). From the perspective of innovation in a firm, the IT department, through its own innovativeness, creates many tools to streamline organizational processes and improve efficiencies. Also, by providing software and hardware tools to the other innovative departments, the IT department enables innovation in those departments. From the resource dependence theory perspective, the IT department's ability to innovate within and also to enable innovation in other departments puts the IT department in an influential position within the firm, and hence the following second hypothesis.

- H2: The innovativeness of the IT department is positively related to influence and power of the IT department within the firm.

Linkage Between Customer Connectedness and IT Department's Influence and Power

The customer connecting role of the IT department pertains to the extent to which the IT department is able to translate customer needs into customer solutions. This role also entails the degree to which the IT department is able to communicate the external customer needs to the various internal departments. For example, an original equipment manufacturer (OEM) may engage a contract manufacturer to introduce a new product into the market. This involves making small prototype quantities to ensure quality and then transitioning into mass production in a manner that supports the OEM's time-to-market strategy. This entire manufacturing supply chain may entail the use of information and communication technologies to automate and optimize business processes. The IT department may proactively work with the external customer to understand their needs, propose, and implement IT solutions, and communicate with the internal departments including engineering, materials procurement, manufacturing, and quality, regarding the external customer needs. Traditionally the sales and marketing departments have been considered as customer advocates and voice of the customer within the organization. Today, however, the IT department joins the sales and marketing departments as the voice of the customer within the firm. Knowing the customer's needs and speaking on behalf of them to the other internal departments increases the IT department's influence and power within the firm.

The preceding discussion, led to the third hypothesis as follows:

- H3: The customer-connecting capability of the IT department is positively related to influence and power of the IT department within the firm.

Linkage Between Collaboration and IT Department's Influence and Power

The technologies implemented by the IT department contribute to improve and increase the degree of internal and external collaboration, enabling the organization's knowledge diffusion, and strengthening communication and teamwork along the firm (Rothwell, 1994). Research literature on information technology portrays the poor relationship problem between IT department and the rest of the organization as one that originates primarily from within the IT department (Peppard, 2001). The IT department is portrayed and managed like an island, and also "designed and positioned as such" in many organizations (Peppard, 2007). Literature has suggested many prescriptions to deal with this problem. Lee, Trauth, and Farwell (1995) suggested changing the skills of IT professionals from the traditional techies to business functional knowledge, interpersonal and management skills. Cross, Earl, and Sampler (1997) reported the role of systems analysts transforming into business consultants. According to Peppard (2001), many of the remedies addressed only the symptoms rather than causes of the gap between the IT department and the rest of the organization. Peppard (2001) further argued that merely injecting broad business knowledge to a technical IT manager to transform the IT manager into a "hybrid manager" was not helpful if the IT manager was isolated from the rest of the organization. If the top management team does not view IT as strategic or does not think IT involvement is needed in strategic decision-making then the CIO does not get the opportunity to make strategic decisions.

In a comparative study, Bensaou and Earl (1998) found that Japanese companies did not depend on setting up IT governance committees, fiddling with the degree of IT centralization, or installing intermediary roles between IT and business functions which are all favored by the western companies. The Japanese did not treat IT as something special; instead, they focused on "shared understanding and relationships" (Bensaou & Earl, 1998, p. 126).

Earl and Feeny (2000) noted that IT departments were inclined to shield their "practices from challenge or criticism" while enthusiastically persuading other departments to change without resistance. IT departments can be "slow to change themselves" (Earl & Feeny, 2000, p. 21). Earl and Feeny (2000) suggested that good formal or informal relationship between the CIO and CEO was important to ensure that "IT is regarded and exploited as an asset" (p. 17).

Stephens and Mitra (1995) observed five successful CIOs who participated in their firm's strategic planning for a week each and attributed their success to operating outside the IT territory, facilitating informal exchanges and interactions with leaders from non-IT functional areas. Brown and McLean (1996) argued that while, in the past, IT managers believed that their role was to manage technology itself, making sure technology performed efficiently, and engines of production were reliable, today's IT managers' success, however, depends on their ability to develop, and sustain partnering relationships with other managers inside and outside the IT department. Peppard (2001) cited extensive past research to suggest that building strong collaborative relationships with business units is the key for IT department's success. In their study of 202 manufacturing firms, Bhatt and Grover (2005) found that building strong relationships between the IT groups and the non-IT groups within a firm significantly affected the firm's competitive advantage. They did not find support for commonly held view that high-quality IT-infrastructure gives a firm advantage over its competitors. The rationale could be that, in today's technology climate, the infrastructure (hardware, networks, software, etc.) have become available in the market to everyone making these resources commodities thereby removing any competitive advantage of having one server over another or one software over another (Bhatt & Grover, 2005). Firm's internal capabilities to build relationships and high levels of partnering behavior are difficult to imitate and replicate giving the firm a unique advantage over its competitors (Bhatt & Grover, 2005). Based on these studies this researcher proposed the fourth hypothesis:

- H4: The partnering capability of the IT department is positively related to influence and power of the IT department within the firm.

IT Orientation

In this study, *IT orientation* is defined as a firm level capability as a business culture that (a) practices the pervasive use of information communication technologies to maintain high levels of business performance (Weill & Aral, 2004) and (b) provides strong top management support to use information technologies (Weill & Aral, 2004). This researcher argues that a strong, dominant IT department can induce an IT-oriented culture within the firm. To describe the IT orientation of the firm, based on the findings of Weill and Aral (2004), this study considers three characteristics, which are practices, throughout the firm. The first characteristic that describes IT orientation or *IT savvy* is the pervasive use of information technologies for communication. High level of IT orientation is visible because of extensive use of electronic communication channels such as email, wireless communication devices, and intranets in the daily work practices of the firm for internal and external communication. The second characteristic is the constant enthusiasm to exploit every opportunity to convert manual transactions into electronic transactions. Specifically, repetitive business processes such as customer order taking, shipment notifications, purchasing, accounts receivable invoicing, accounts payable invoicing, employee travel and other expense reimbursement processing are all performed electronically using electronic data interchange (EDI), Rosettanet, and other electronic transaction exchange methods between the company's business applications. The third characteristic is the extensive use of Internet technology. Although many off-the-shelf traditional business applications are available, these firms exhibit greater levels of use of Internet technology. For example, use of web-based sales force management application instead of the traditional customer relationship management or contact management software; use of the web-based human resource management application instead the traditional HR management systems; use of Internet based applications for internal employee collaboration, performance measurement, employee training delivery, customer support, and help desk applications. While the preceding three characteristics are necessary for high level of IT orientation, or IT savvy, they are not sufficient. To institutionalize these three IT orientation characteristics, a firm needs three company-wide behaviors (Weill & Aral, 2004). First is the competency throughout the organization to use the above mentioned information technologies effectively: strong IT and business competency among IT department employees, and strong IT competency among non-IT department employees. Second is the strong top management commitment to use information technologies exhibited by championing IT initiatives. Third is the strong partnering behavior between the IT department and non-IT departments and business units within the firm to generate business value from IT investments.

Weill and Aral (2004) studied 147 firms over a four-year period and found that top performers had higher levels of IT orientation. The 7-Eleven in Japan with over 10,000 stores is an example of a firm with a high level of IT orientation within the firm (Weill & Aral, 2004). The entire supply chain of the firm including its 10,000 stores, suppliers, and the headquarters, is connected by 70,000 computers (Weill & Aral, 2004). Internet technology is used to communicate product information, sales, weather conditions graphically so that food is delivered fresh to all the stores three times daily. Company counselors work with the stores to reinforce the use of IT to conduct business, and to improve the IT skills of employees. The store owners, store clerks, and part-time workers work together to optimize store inventory. According to Weill and Aral the high level of *IT orientation* of the 7-Eleven company as a whole has positively affected the firm’s business performance by increasing its gross profits per store from 5% in 1977 to 30% in 2003.

Model 2 Hypotheses: IT Department's Influence and Power, IT Orientation, and Business Performance

Drawing support from contemporary research in IT management, the linkages between the IT department's influence and power, IT orientation, and business performance are developed in the following sections. Also, the theoretical assertion for each linkage is stated as depicted in the subordinate Model 2 shown in Figure 3.

Linkage Between IT Department's Influence and Power and IT Orientation

There is no evidence in IT literature indicating that a strong and influential IT department causes the firm to be IT oriented. Stated differently, the propensity to use more IT is not dependent on the presence of an influential IT department within the firm. Therefore, in this study, the IT department's influence and power is not considered an antecedent of IT orientation of the firm. Instead, a direct link is included between the IT department's influence and power and IT orientation, and both are considered to affect firm performance. IT orientation as used in this study refers to the propensity to use information technologies in the organization. Various degrees of propensity to use IT by the employees of the firm may lead to various degrees of adoption and absorption of IT in the organization.

Although one could argue that an influential IT department can enhance the propensity to use IT, a counter argument that it is the propensity to use IT that renders the IT department influential is also valid. This circular relationship can be explained as follows. IT department may bring in a new technology solution which is attractive and generate interest amongst employees. The World Wide Web is an example. When it was commercialized, the IT departments implemented it in their organizations, it generated curiosity, employees used it to browse the web, acquire new knowledge, and become more productive. Initially, when the web technology was new, only the IT department had the technical knowledge and expertise to help users. Because of this exclusive knowledge everyone depended on the IT department and this dependence made the IT department influential in the organization. Over time, as employees became more knowledgeable about the web, their propensity to use the web technology increased and they demanded more support from IT, and users of the web became more influential. Thus, diffusion of IT within firms suggests that the initial role of IT as a driver of diffusion of IT could become less relevant over time. In this case, a strong IT department might not be necessary to create IT orientation (IT savvy) within the firm. It could be argued that an organization-wide adoption of information technologies implies an influential IT department. In other words, IT orientation is an antecedent of the IT department's influence and power rather than the IT department's influence and power being an antecedent of IT orientation. This also suggests a possible dual causality between the IT department's influence and power and IT orientation. Recognizing the potential absence of a relationship between the IT department's influence and power and IT orientation and the possibility of a dual relationship between the IT department's influence and power and IT orientation, this researcher proposed the following fifth hypothesis:

- H5: IT department's influence and power has a positive effect on IT orientation within the firm.

Linkage Between IT Department's Influence and Power and Business Performance

Beyond its indirect effect on business performance through IT orientation as posited in the preceding discussion, the IT department's influence and power within the firm also has a direct relationship to business performance. This researcher argues that, in addition to the firm's shared knowledge through IT orientation, more specialized knowledge through the influence and power of the IT department drives business performance. Thus, this researcher proposed the following seventh hypothesis:

H7: The influence and power of the IT department is positively related to business performance.

Model 3 Hypothesis: Linkage Between IT Orientation and Business Performance

The dramatic propagation of personal computers and software, continuous drop of hardware costs, and the massive reputation and adoption of the Internet have advanced the users' knowledge of information technologies. Instead of seeking IT department's help to implement information technologies, users are taking on the task themselves. Non-IT departments are becoming more confident about their ability to deal with and satisfy their own information technology needs. Furthermore, non-IT departments are frequently viewed as being able to manage IT eliminating the need for corporate IT department. Such "independent spirit and self-reliance" regarding information technology are characteristics of high levels of IT savvy, or IT orientation of the firm. Top management of IT oriented firms is aware of the type of IT investment they want to make to increase their firm's performance. For instance, IT oriented top management focusing on cost leadership is aware of transaction processing systems which can reduce transaction costs, or increase throughput for the same cost, may push the IT department to drive implementation of those systems. Awareness of available information communication technologies and the benefits that can be achieved foster a climate of speedy technology adoption and diffusion within the firm. This can lead to higher levels of business performance through efficient transaction processing, timely information flow, collaboration, and communication. Therefore, this researcher proposed the following sixth hypothesis.

H6: IT orientation is positively related to business performance.

Covariates and Control Variables

Innovativeness of the firm is a covariate of business performance (Deshpandé, Farley, & Webster Jr., 1993; Deshpande, Farley, & Webster Jr., 2000). In this study, innovativeness of the firm is defined as the extent to which there is a "strong emphasis on R&D, technological leadership, and innovations" (Covin & Slevin, 1989, p. 86) within the firm. This research distinguishes the innovativeness of the firm from the IT department's innovativeness. Whereas the IT department's innovativeness considers its contribution to newly developed products or services through delivering new IT tools, a firm's innovativeness reflects the strategic emphasis on being an innovative firm.

In addition to accountability, innovativeness, customer connectedness, and partnering with other departments described in the preceding discussions, this study assumes that certain firm and environmental characteristics may also affect the IT department's influence and power within the firm. These controls are added exclusively to account for some observed effects. Due to the particular research questions pertaining to the IT department's influence and power that this study is undertaking, the potential interrelationships between these control variables and the core constructs of this study are not of interest. No specific hypotheses considering these covariates and control variables were proposed.

Firms that are focused on short-term goals are more likely to view the IT department as a service provider and demand low-cost efficient service. On the contrary, firms focused on long-term goals are more likely to view the IT department as a strategic partner for realizing the long-term goals of the firm. The type of business strategy a firm pursues may also have an effect on the role of the IT department within the firm – whether the IT department is an influential, strategic decision-maker or an efficient service-provider. Firms may pursue a cost-leadership strategy, a differentiation strategy or a focus strategy. A firm pursuing a cost-leadership strategy is primarily interested in reducing transaction costs, and the IT department is viewed as a service provider rather than a strategic partner by the top management team of the firm. On the other hand, a firm pursuing a differentiation strategy is primarily interested in creating unique value to customers in the markets in which it serves. In this situation, the IT department is sought to participate in strategies and decisions regarding new product and service offerings of the firm.

Prahalad and Bettis (1986) argued that the dominant logic of a firm tends to be centered on the strategic characteristics of the core business with which top management is familiar (p. 489). Based on this theory, the dominant logic of some firms is centered on IT. Such a firm orientation can affect the IT department's influence and power within the firm. In their upper echelons theory, Hambrick and Mason (1984) argued that organizations are shaped by the backgrounds and beliefs of the top management team members. Thus, based on previous studies (Pfeffer, 1981), the IT department's influence and power is enhanced if the CEO's background and education are in technical, engineering, or IT fields. Publicly traded companies are more likely to have an IT department, more so than startup or private companies. Publicly traded firms are held to stricter standards of compliance today due to corporate scandals, including Enron and the recent debacle of the financial industry. In order to comply with legal requirements such as Sarbanes Oxley Act, Privacy, and government audits the IT department is more likely to have higher levels of influence and power because of its ability to collect, hold, and disseminate business information. Since much of business information such as agreements with business partners, correspondence with employees and others, take place through the company email, and the IT department is tasked with implementing and maintaining the email systems, IT department collects, holds, and disseminates company information. If the company is involved in a law suit, the IT department takes charge of providing the relevant information to the company's legal department to defend the case in the court. Consequently, IT department has a high degree of pervasiveness thereby increasing its influence and power within the firm.

Environmental characteristics including market turbulence and technological turbulence may have a controlling effect on the dependent variables. For example if customer preferences change frequently, the firm must be able to respond quickly with new products and services. If technology changes rapidly, the firm must adapt to the changing environment quickly. The IT department plays a critical role in these situations and should be more influential.

The theoretical model was described in the preceding sections. The question of how the constructs will be measured needs to be addressed. The constructs, which form the overall research model, are latent variable constructs, and therefore, cannot be directly observed and measured. The following section addresses this issue in greater detail.

Appropriateness of Using Perceptual Measures

There is no objective data on IT department's influence and power within the firm; there are no objective measures, and data for accountability, innovativeness, customer connectedness, partnering with other departments, and IT orientation. These are perceptions within a firm. In this study, these are latent unobserved variables. This researcher contends that the perceptions of senior management personnel including directors, senior directors, general managers, vice presidents, chief operating officers, chief procurement officers, chief financial officers, and chief executive officers can help to operationalize the antecedent variables namely accountability, innovativeness, customer connectedness, and collaboration with other departments. However, perceptions are self-reported data. There is a possibility that the participants' responses to a questionnaire may be affected by the time of day, the participant's experience, or lack of it, with the IT department at a given moment. Also, the firms have become more complex because of the global nature of business with virtual workplaces and the turbulent markets in which they operate (Tallon, Kraemer, & Gurbaxani, 2000). Consequently, senior managers' perceptions about the IT department in their firm may not be an accurate reflection of their experience with the IT department.

Notwithstanding the issues of legitimacy and accuracy of perceptual measures, there is existing literature showing that perceptual measures can be used as proxies for objective measures (Tallon, Kraemer, & Gurbaxani, 2000, pp. 148-149). In a study of a firm's sales growth, net income growth and return on investment relative to that of major competitors, Venkatraman and Ramanujam (1987) found a high degree of correlation between perceptual and objective measures (p. 118). There are more acceptances of perceptual measures in IT research (Leclercq, 2007; Petter, Delone, & McLean, 2008). According to Petter, Delone, and McLean (2008), asking users of systems regarding the effect of IT on firm performance is not appropriate, but senior managers and executives are better informants of IT (p. 242). Senior managers and executives are the direct consumers of the efforts and outputs put forth by the IT department and, therefore, are in a better position to form an overall perception about the IT department (Tallon, Kraemer, & Gurbaxani, 2000, p. 149). Also, perceptions of senior managers and executives are further enriched by the exposure they receive to the "views of peers and subordinates" regarding past experiences with the IT department (Tallon, Kraemer, & Gurbaxani, 2000, p. 149). These arguments support the approach taken in this study to use the perceptions of senior managers and executives as proxies for measuring IT departments' influence and power and its consequences for the firm.

Definition of Terms

Average variance extracted (AVE): It is a summary measure of convergence among a set of survey items representing an endogenous or exogenous construct. It is the average percentage of variation explained (variance extracted) among the items of a construct. The higher the AVE value, the better.

B values: These are the unstandardized regression coefficients (or regression weights). The B weight associated with an indicator variable is given in terms of the units of this variable. For example, if the indicator is measuring the height and weight in inches and pounds, then the B values would be in inches and pounds also.

Beta values or β values: These are the standardized regression coefficients (or regression weights). The beta (β) uses a standard unit that is the same for all the indicator variables. For example, if the indicator variables are measuring height and weight, the unit of measurement of the beta value would be common to weight and height. Beta weights help compare two variables that are measured in different units.

Construct reliability (CR): It is a measure of reliability and internal consistency of the measured variables representing the latent variables.

Construct validity: The extent to which a set of indicator variables represents the latent construct which the indicator variables are designed to measure.

Endogenous constructs: Unobservable or *latent* concept, multi-item equivalent to dependent variables. In a path diagram, one or more arrows lead into the endogenous construct.

Exogenous constructs: Unobservable or *latent* concept, multi-item equivalent to independent variables. They are constructs determined by factors outside the model.

Fit index: It is a statistical value used to evaluate a model. Several fit indexes are used in structural equation modeling. They are based on a comparison of the current model being tested to models based on extremes like a model that perfectly fits the data and a model that is a worst fit equivalent to no model at all.

Imputation: A statistical method of estimating missing values in a dataset.

Indicator variable: It is a variable that is measured or observed. It is also called as a manifest variable. These are the items on a survey instrument.

Latent variable: It is an unobservable variable. It is not measured. It may be estimated by one or more indicator variables. A latent variable is uncorrelated with random error.

Path diagram: It is a visual representation of a model and the relationships among the model's constructs.

Squared multiple correlations: Values representing the extent to which the variance of an indicator variable is explained by a latent factor.

Assumptions

In this study, a web panel was used for data collection with the assumption that sample data would be normally distributed. This researcher assumed that respondents would be truthful in answering the survey questions.

Limitations of the Study

This was a cross-sectional survey study and was a snap-shot in time of the organization's context. This researcher assumed that causality exists and used structural equation modeling to test causality. Generally, survey is used for testing relationships and associations amongst variables in a study, not causality.

Therefore, a limitation of this study is that it does not necessarily confirm causality. A second limitation is the generalizability of the study results since the survey respondents were from the United States only. Other countries and cultures may have an impact on the variables tested in this study. A third limitation is the response bias. Since the data was collected from an anonymous Web panel, there was no way to ensure that each firm had more than one survey participant. This could have resulted in a single response bias.

Delimitations of the Study

This study was delimited to online survey of senior management and executive rank personnel in public traded and private companies in the United States. Individual contributors in the lower ranks—including engineers, project managers, analysts, administrative and other staff personnel—were excluded. This study also excluded nonprofit enterprises.

Significance of the Study

This study was built on prior research about the role of IT departments within firms. This study also explored the consequences such as the IT savvy of the employees and the effects on business performance resulting from the IT department's role within the firm. Its main contributions to these studies are as follows: First, this study included IT department capabilities as antecedents of IT department's influence and power: accountability, innovativeness of the IT department, customer connecting capability of the IT department, and the IT department's capability to partner with other departments. Previous studies have not included antecedent variables. Second, this study included two measures of IT department's influence and power - perceived power and top management respect - while previous studies focused either exclusively on departmental power based on the theory of strategic contingencies (Hinings, Hickson, Pennings, & Schneck, 1974; Lucas, 1984; Saunders & Scamell, 1986) or based on the relationship between the CEO and the CIO (Feeny, Edwards, & Simpson, 1992; Jones, Taylor, & Spencer, 1995). Third, this study explicitly included a link between the IT departments' influence and power and IT orientation. No previous studies were found examining whether dominant IT departments induce an IT-oriented culture. Finally, this study paves the way for new studies by raising the significant question on whether strong IT departments are actually required for firms.

Implications for Positive Social Change

Organizations ground themselves in Nobel Laureate Milton Friedman's social responsibility of business (Friedman, 1970) by saying that maximization of profit is their only social obligation (Seiling, 2001, p. 186). According to Friedman, the purpose of businesses is to supply, as profitably as possible, the goods and services people ask for. The assumption is that, the profitable organization provides jobs, purchases goods and services, pays taxes, and as an outcome, adequately contributes to the welfare of the community. Perhaps these familiar profit-motivated business processes could be used to generate positive social change in the existing social context (Sheats, 2000). One possibility is for businesses to supply goods and services as cost effectively as possible to the underserved communities who might benefit from the right kinds of services (Avital et al., 2007; Sheats, 2000). IT departments can enable businesses to achieve this. This researcher argues that the subservient treatment of IT departments in organizations makes it difficult for these departments to proactively advocate such social responsibilities to business leaders. A firm that is socially responsible will hire employees, buy materials and services it needs from the local community in which it operates. After all, many of a firm's customers will come from the surrounding areas. When the local community is prosperous, it can only benefit the businesses operating there. IT departments can do a great deal to help both local businesses and schools. They can provide technical training to businesspeople, offer free computer courses in local schools, and offer internships to high-school students. Less powerful IT departments do not get the opportunity to make strategic decisions that benefit communities and society. Corporations treat their IT departments as overhead costs that must be reduced leading to outsourcing decisions. Lack of influence and power renders the IT department less effective in preventing such top management strategic business decisions. The results of this study could be used to enhance the IT department's influence and power, and to increase the possibility that it could participate in and affect top management decisions in ways that will benefit the community.

Organization of this Dissertation

Chapter 1 introduced the research topic and described the background of the study, the problem statement and the purpose of the study, research questions and formulation of the hypotheses. Following the outline suggested by the theoretical framework depicted in Figure 1, chapter 2 presents a review of the theoretical and empirical research literature. The tenets of resource dependence theory and strategic contingencies theory are presented. The theoretical foundation is applied to the study's variables to support the research model. Empirical research in IT management and organizational literature is reviewed to derive and support the hypotheses. Chapter 3 describes the methodology used to develop the statistical model. The principles of structural equation modeling are discussed along with the approach for developing and testing measurement and structural models. Chapter 4 presents the data analysis, including descriptive statistics, SEM analysis of the statistical model and the resulting parameter estimates; and interpretation of the statistical analyses. Chapter 5 discusses the results and presents the implications for research and practice; the implications for positive social change, and suggestions for further research are also presented.

Chapter 2: Literature Review

Introduction

The central theme of this study is based on the notion that the effectiveness of the IT department within a firm depends to a certain extent on its influence and power in relation to other departments within the firm (Lucas, 1984; Saunders & Scamell, 1986). Based on this researcher's observations in organizations for more than 25 years, on the one hand, the IT department does not participate in strategic decision making because of lack of influence and power, and on the other hand, the IT department does not have influence and power because of lack of participation in strategic decision making. Generally, in the organizational hierarchy, the IT department is positioned two or three levels below the CEO, the ultimate position of power. The head of the IT department, the chief information officer, often reports to the chief financial officer. Consequently, in most organizations, the IT department may not have a position of power and may not participate in strategic decision making. Understanding the dynamics of intraorganizational power is useful for practitioners and researchers alike to ascertain the balance of power between IT and the other departments in the firm. However, research studies in the domain of information communication technologies that focus on organizational issues generally ignore the organizational variables including politics, influence and power. The frameworks for information technology research published during the last two decades have overlooked influence and power as one of the dimensions (Au, Ngai, & Cheng, 2002; Carroll & Swatman, 2000; Cushing, 1990; David, Dunn, McCarthy, & Poston, 1999; Grover & Malhotra, 1999; Ives, Hamilton, & Davis, 1980; Wainwright & Waring, 2007; Wilson, 2004). So far, there have been very few conceptual, descriptive, or empirical contributions to the literature that address the IT department's influence and power within the firm.

Following the guidelines of the theoretical framework depicted by Figure 1 in chapter 1, this chapter is organized as follows: First, the foundational theories – resource dependence and strategic contingency – are discussed to draw theoretical perspectives on the dynamics of influence and power in organizations. Next, the IT management and organization literature is reviewed to understand the typology and sources of influence and power available to the IT department. Then, contemporary literature on influence and power in organizations is reviewed, followed by empirical studies on intraorganizational power, focusing on the IT department. Perspectives are then drawn from foundational theories and contemporary literature is integrated to develop the theoretical constructs of the research model depicted by Figure 2 in chapter 1. Next, the various research methods employed by the IT research community are explored. Finally, literature on the research method used in this study is reviewed.

Theoretical Foundation

Barnes (2000) summarizes the different concepts that influence and power represent: "power is something you *have*, whereas influence is something you *do*" (p. 9). The two terms are, however, closely related and often used interchangeably. Many different definitions have appeared in the literature, and in some cases, influence and power have been used to define each other. French and Raven (1959) described power as the ability to influence decision outcomes, and influence as the ability to affect a change in beliefs. These conventional definitions of influence and power assume that "power exists as a capacity that can be possessed, and exercised over others in a mechanical or causal manner" (Doolin, 2004, p. 344). These concepts also view power as something that is punitive, suppressive, or intimidating (Bloomfield & Coombs, 1992). Such negative notions of power are based on the implication that, since possession of organizational resources bestows power on their possessors, when the distribution of resources changes it also produces a corresponding change in the distribution of organizational power (Doolin, 2004). Previous studies on IT management (e.g., Pettigrew, 1972) have embraced this line of thinking and discourse regarding power and continue to do so as the dominant view of power (e.g., Pfeffer, 1994; Jasperson et al., 2002). The major drawback of this approach is that it completely ignores the possibility that organizational power can also be relational (Clegg, 1989). That is, power is a capacity for action that is embedded in social relations (Doolin, 2004) and not something that one can possess. Power exists only when exercised, when put into action. Foucault (1977; 1980) developed this relational view of power and argued that power is not an external entity that is brought to bear from the outside, but rather it is exercised from within the social body in the relations: "It seems to me that power is 'always already there', that one is never 'outside' it" (Foucault, 1980, p. 141). In today's complex global society, people live their daily lives by maneuvering through a field replete with responses and actions. Foucault (1982) suggested that power operates by structuring this field of potential actions and reactions. This shows in a variety of practices and technologies that people put forth in response to the actions of others (Hindes, 1996).

Based on the preceding discussion, since one cannot do something with what one does not have, separating influence and power into two distinct concepts is of little value for this functional (departmental) level study – a department in a firm is a social body of relations and its employees routinely negotiate responses and actions with implicit influence and power tactics at various levels. Influence and power is dispersed throughout the organization at various levels within and between the departments (Gutting, 2005). Therefore, this researcher does not distinguish influence and power as two distinct concepts, but rather uses these two terms in conjunction as a single integrated concept.

Pfeffer (1992) argued that power emerges naturally from the division of labor in organizations. According to Emerson (1962), the divisions of labor denote differences of interests which must be integrated in order to achieve a goal. Dependency arises from this integration effort and shapes the way sources of power are established (Emerson, 1962). Pfeffer (1981) suggests two forms of dependence: resource dependence, when an individual or group controls a common, scarce and valuable resource, such as information, (Pfeffer & Salancik,

2003) and pervasiveness due to interdependence amongst departments within a firm (Hinings et al., 1974), based on the strategic contingency theory of intraorganizational power. These two sources of power are the most pertinent to the focus of this study - the IT department's influence and power - and will now be discussed.

Resource Dependence Theory

Pfeffer and Salancik (2003) view organizations as coalitions of interests which alter their purposes and direction as changes take place in the coalitional structure. Like Mintzberg (1973) they draw a distinction between internal and external coalitions, although they do not use these terms. Internal coalitions may be viewed as groups functioning within the organization (e.g., departments and functional areas). External coalitions include such stakeholder groups as stockholders, creditors, suppliers, government and various interested publics. Pfeffer and Salancik place their primary emphasis on the role of environmental (i.e., external) coalitions in affecting the behavior of organizations. They believe that "to describe adequately the behavior of organizations requires attending to the coalitional nature of organizations and the manner in which organizations respond to pressures from the environment" (Pfeffer & Salancik 2003, p. 24). The reason for the environmental focus of the model is that the survival of the organization ultimately depends on its ability to obtain resources and support from its external coalitions, Pfeffer and Salancik (2003) implicitly assume that survival is the ultimate goal of the organization and that to achieve this objective, the organization must maintain a coalition of parties willing to legitimize its existence (Stevenson, Pearce, & Porter, 1985). To establish and maintain such coalitions, the organization offers various inducements in exchange for contributions of resources and support (Pfeffer & Salancik, 2003). However, the contributions of the various interests are not equally valued by the organization. As such, coalitions that provide "behaviors, resources and capabilities that are most needed or desired by other organizational participants come to have more influence and control over the organization" (Pfeffer and Salancik 2003, p. 27). Similarly, organizational subunits (departments, functional areas, etc.), which are best able to deal with critical contingencies related to coalitional contributions, are able to enhance their influence in the organization.

Influence and power is a complex construct whose definition and operationalization has been debated extensively in organizational literature. The definitions include the concept that influence and power is the capability of one individual or a department in an organization to overcome opposition in accomplishing a desired outcome (Garavan, Barnicle, & Heraty, 1993). There is general consensus that influence and power characterizes relationships among social actors and is context or relationship specific (Salancik & Pfeffer, 1977; Garavan, Barnicle, & Heraty, 1993). Although the study of power includes the bases such as rewards, punishments, legitimacy and so on, this study focuses on the organizational and intraorganizational bases of power proposed by Pfeffer and Salancik (2003) such as resource provision, resource irreplaceability, and network centrality. Pfeffer and Salanicik note that power derives from activities rather than individuals, and it is situation dependent, on scarcity of resources, not abundance of resources. Power is based upon a department's ability to deal with, or make decisions, on actual or potential organizational problems (Saunders, 1990).

Strategic Contingency Theory of Intraorganizational Power

While the resource dependence theory, developed by Pfeffer and Salancik (2003), contends that influence and power are derived from criticality and scarcity of resources, Hickson, Hinings, Lee, Schneck, and Pennings (1971) developed the strategic contingencies' theory of intraorganizational power, which hypothesized, that the departments in an organization derive their power from the mutual dependencies which are created among them by different power ranks and which directly affect the relative influence and power status of the departments. The differential power ranks of the departments are created by the degree to which a department deals with and lessens the effect of uncertainty on other departments; the degree to which this capability can be substituted; and the degree to which a department's activities are linked with those of other departments. It is the interrelationship of these three conditions which shapes the relative level of influence and power a department can possess.

Hickson, Hinings, Lee, Schneck, and Pennings (1971) argued that a department gains higher levels of influence and power if it controls more contingencies within the organization. Hinings, Hickson, Pennings, and Schneck

(1974) later tested this theory using sample data collected from four departments in seven manufacturing organizations. The departments considered in the sample were engineering, marketing, production, and accounting. The organizations selected were five breweries (three in western Canada and two in Midwestern US) and two divisions of a container manufacturing company in Canada. The two container company divisions manufactured two distinctive products for two different markets: one division manufactured folding cartons and the other corrugated cases. Each division had a production and a marketing department but shared the services of engineering and accounting departments. The researchers collected data using both personal interviews and mailed questionnaires. The authors performed correlational analysis of the data and their interpretation of the statistical analysis showed that coping with uncertainty is most important, supported by immediacy, non-substitutability and pervasiveness in that order. Their results confirmed the notion that a department's influence and power within the organization depends on the number of contingencies it controls. Given the dependence of today's firms on computers for information, the IT department has a high degree of involvement in many workflow activities within the firm and, therefore, has opportunities to control many contingencies thereby leading to higher levels of influence and power.

Information as a Source of Power

While the preceding discussion laid the foundation for how influence and power of a department within the firm originates, the fact that possession of information can also be a source of power cannot be ignored (Mutshewa, 2007, p. 250). Researchers in the field of information have always argued that a relationship exists between information and power (Mutshewa, 2007, p. 249). The adage “information is power” is an impetus for researchers who discuss information issues (Hirschheim & Newman, 1991; Mutshewa, 2007). Pfeffer and Salancik (2003, p. 77) suggested that departments, which are concerned with their influence and power, collect information to enhance their status. By acquiring and controlling information which is critical, a department can acquire influence and power (Hinton & Kaye, 1996, p. 417). Based on this notion, the IT department, which implements the systems to create the information and has access to the corporate databases, and, therefore, access to various data and information, can be thought of as having higher levels of influence and power relative to other departments within the firm.

Applying the theoretical tenets of strategic contingencies and the notion of information is power, one would conclude that the IT department is likely to have a higher level influence and power status relative to other departments within the organization. Researchers (e.g., Markus & Bjorn-Andersen, 1987; Lucas, 1984) pursued this line of argument. However, several study results (e.g., Lucas, 1984; Saunders & Scamell, 1986) disagreed with this argument. One possible explanation for the contradiction is the type of information. Notwithstanding the arguments about the ability of information to grant power, not every piece of information can do so. The aspect of necessity and utility of the piece of information collected is important to discern its ability to bestow power. Although information reduces uncertainty, absence of uncertainty takes away its ability to create power (Pfeffer & Salancik, 2003, p. 77). Also, it is not necessary to collect information if there is no uncertainty. For instance, it is not necessary for the marketing department to collect a lot of market research data if there is no difficulty in selling products (Pfeffer & Salancik, 2003). Market data are necessary only when it is difficult to sell products or forecast future demand.

Based on the preceding discussion, information is an important contingency. Based on the strategic contingency theory, the department, including the IT department, which controls information, can derive influence and power. However, based on resource dependency theory, possession of information is not sufficient to gain influence and power.

Empirical Research on Influence and Power in Organizations

Researchers in the organizational and behavioral sciences have attempted to delineate power and put forward a multitude of definitions. In this literature review, this researcher is not attempting to submit yet another definition, but to examine and describe some background information relating to the characteristics of power helpful in giving guidance to this study. Existing literature (e.g., Raven, 1993, p. 233; Lam, 1996, p. 14; Muteshwa, 2007, p.254) has classified power into six types based on how it is derived. These are the reward power, coercive power, referent power, legitimate power, expertise power and informational power and are defined as follows:

- Coercive power – derived from one’s ability to threaten or dispense punishment.
- Reward power – one’s ability to give out monetary or non-monetary compensation derived from having control over resources.
- Legitimate power – derived from one’s right to influence.
- Expert power – derived from one’s knowledge.
- Informational power – one’s ability derived from possession of information which can be used to convince others.

However, each type of power is conceptualized differently in the existing literature. Some researchers discuss power in the light of how it influences relationships between people. For example, according to Horton (2003), “power can be viewed as a personal trait or power can be viewed as a consequence of a position within a hierarchy” (p. 122). This means power can be viewed as something that people hold and use to further their interests (Muteshwa, 2007).

Literature in the 60s and the 70s, including the seminal work of French and Raven (1959), suggested that relationships among departments in an organization give rise to power and, therefore, should be viewed as the property of those relationships rather than the traits of individuals (e.g., Emerson, 1962; Perrow, 1970; Hickson, Hinings, Lee, Schneck, & Pennings, 1971). These scholars also suggested that power is the actual as well as the perceived ability of an individual or a department in an organization to bring about change. The sources of power have been described in the strategic contingencies model by

Hickson, Hinings, Lee, Schneck, and Pennings (1971) and the resource dependence model by Salancik and Pfeffer (1977), and includes the following:

- Coping with uncertainty - is the extent to which the unpredictability of future events can be effectively dealt with or reduced. In organizations, departments that are best able to cope with uncertainty both on their own department's behalf and on behalf of other departments within the firm will tend to have more power than those departments that are not able to do so. Coping strategies include taking proactive interaction (coping by prevention), forecasting future outcomes (coping by information), and absorbing the consequences after the fact (coping by absorption) (Hickson et al., 1971; Hinings et al., 1974).
- Substitutability - is the ease with which the activities of one department can be performed by other departments. If many needed resources or performance can be obtained from many sources, then the power of any one source would be reduced (Emerson, 1962; Blau, 1964; Pfeffer & Salancik, 2003). For example, if the capability for coping with uncertainty is widely distributed amongst many departments within the organization, then the power of any one department would be small (Pfeffer & Salancik, 2003).
- Pervasiveness - refers to the degree to which one department is connected with other departments within the firm (Hickson, et al., 1974; Pfeffer & Salancik, 2003). The connectedness of one

department's activities with several other departments' activities causes a greater amount of workflow interaction between departments fostering mutual dependence to get tasks done. When the degree of dependence on one department increases, the potential power of that department also increases.

- Immediacy - reflects the extent to which the activities of a department are essential to the primary workflow of the organization. An alternate term namely the task criticality has been adopted by some researchers (Saunders & Scamell, 1986). Theoretically, the more critical the tasks performed by a subunit, the greater its power.
- Criticality of resources - Salancik and Pfeffer (1977) suggested that subunits that control critical resources will have a greater ability to influence decisions, and thus, greater power.
- Scarcity of resources - Salancik and Pfeffer (1977) argued that the scarcity of the resources controlled by a subunit contributes to the amount of power that subunit can attain.

While the strategic contingencies theory and the resource dependence theory identified sources of influence and power in organizations, as described above, researchers have suggested that these sources could lead to three types of power dimensions namely perceived power, participation power, and position power.

- Perceived power - defined as the influence attributed to a department by members of the organization (Hinings, et al., 1974; Lucas, 1984; Saunders & Scamell, 1982). As such, perceived power may or may not equate with actual power. However, it can be argued that departments that are perceived as having power, at least to some extent, acquire or enhance power simply by virtue of the perception (Lucas, 1984; Saunders & Scamell, 1982).
- Participation power - is based on the involvement and scope of influence a given department has in decision making across the organization (Hinings, et al., 1974; Saunders & Scamell, 1982). Kaplan (1964) described three sub dimensions of participation power: weight, scope, and domain. Weight is the extent or degree to which a department affects the decision process. Scope refers to the range of decision areas that are affected, while the domain is the number of departments whose behaviors are involved.
- Position power - is based on the formal, legitimate position of the department within the organization (Hinings, et al., 1974; Saunders & Scamell, 1982). A department's position or level in the company's formal organization chart is an indicator of its relative influence and power (Saunders & Scamell, 1982).

The preceding discussion reviewed the sources of influence and power available to the IT department. Literature is sparse on applying these models and dimensions to study departmental power in organizational settings particularly with reference to the IT department's influence and power within the firm. In the following section, available research studies and their findings will be discussed. Their implications for the current study will also be examined.

The Growth of IT Department and its Power Status

Some 40 years ago the IT department was called the management information systems department, or simply MIS. Later it became the information systems department, or simply IS. MIS was an island unto itself; the purveyors of information sat behind closed doors in air-conditioned rooms filled with mainframe computers, terminals, and data entry equipment. The MIS ensured that transactions, mainly financial transactions, were processed without any problem, and generated the reports that the other departments, mainly the accounting and bookkeeping departments, needed. Users trusted MIS to handle the complicated computer technology, had "minimal involvement in processing data and generating information," but understood the "business benefits" of technology and "paid for it as a cost center" (Ragowsky, Licker, & Gefen, 2008, p. 24). However, the IT department's role evolved from information provider, prior to the 1970s, to that of a technology provider. Ragowsky, Licker, and Gefen, (2008) document this evolution as follows:

> In the late 1970s and early 1980s, online processing was still mainframe-based and closely guarded by IT professionals. Minicomputers were increasingly reliable and affordable as business computers, with bigger

> companies using them in distributed IT strategies. When PCs appeared, their relatively low price enabled greater access for whole companies and individual users alike. Consequently, end users were more familiar with IT and began acquiring and developing their own applications. Hardware, software, and telecommunications vendors took note. By the 1990s, they had changed the name of the field from IS to IT as they pushed the latest technology solutions. This shift transformed the IT function from information provider to technology promoter. (Ragowsky, Licker, & Gefen, 2008, p. 24)

With the decentralization of IT and the complexity of IT, the traditional IT-user relationship, which was based on fulfilling the information needs of the user departments, became lackadaisical. As technological complexity increased, the user departments began to feel intimidated by too much technology, were less satisfied with the information they got and the IT department which provided it (Ragowsky, Licker, & Gefen, 2008). Also, companies began to realize that there was a large duplication of effort across different departments (Rathnam, Johnsen, & Wen, 2005). To address the issues of technological complexity and user satisfaction, organizations began creating a “separate IT department responsible for developing and supporting information technology resources across the enterprise” (Rathnam, Johnsen, & Wen, 2005, p. 1).

According to Pfeffer and Salancik (2003) “it is almost a management adage that when something becomes a problem, one established a department to deal with it" (p. 77). Pfeffer and Salancik (2003) argued that the differential influence of a department extended to the organization as a whole. For example, in 2008, as an employee of a large multinational corporation this researcher was tasked to implement a records management departmental function to manage the business records of the company in order to support the litigation matters affecting the company. The department had sponsorship and support from the CEO, CFO and the board of directors. The department was able to secure budget approval for over $2 million to implement software and systems even though the company was in a cost-cutting mode due to the difficult recessionary trends. The divisions and departments of the company worldwide were asked to cooperate with the records management department. Consequently, the other departments within the organization perceived the records management department to be influential. This perceived influence extended into the rest of the organization and involved the records management department in product design, production, manufacturing, finance, and other areas. The extensions of records management department's influence were accompanied, of course, by justifications showing the importance of managing records pertaining to those other departments.

While the centralized IT department may bring the benefits of economies of scale and scope by simplifying network infrastructure, sharing of maintenance and support, maximizing IT efficiency, "enabling enterprise-wide deployment of IT" (Rathnam, Johnsen, & Wen, 2005, p. 1), it may also create a communication gap and alienate the IT department from the other departments (Luftman, Kempaiah, & Rigoni, 2009; Rathnam et al., 2005). In such a situation, the IT department and the other departments lack close relationship, IT department fails to meet commitments, IT does not understand business, and IT does not prioritize well (Luftman, Papp, & Brier, 1999). These and other organizational characteristics and dynamics with respect to influence and power have continued to hold researchers' interests.

Contemporary Research on Influence and Power in Organizations

There is a gap in the research about IT departments' influence and power. Some researchers (e. g., Lucas, 1984; Lucas & Palley, 1986) examined whether or not IT department has influence and power and concluded that it does not have power relative to other departments within the firm. Other researchers (e.g., Lim, 2009; Saunders, 1981; Saunders & Scamell, 1986) have not predicted IT departments' influence and power per se, but rather examined the relative level of power held by the IT department compared to other departments based on the tenets of strategic contingencies theory and resource dependence theory. Between these two approaches, there is a lack of work studying the situational factors in organizations which may affect the IT departments' influence and power. What factors affect the IT department's influence and power is certainly worth looking at. The findings could be attributed to the factors and useful for professional practice only if one also investigates them in the context of the consequences for the organization. The current study investigated four factors as the antecedents which could positively affect the IT departments' influence and power, and also the effect of the IT departments' influence and power at the firm-level upon the business performance and the IT savvy.

Because the theory is not well developed in the area of antecedent factors affecting IT departments' influence and power, this researcher explored contemporary research on influence and power in organizations to generate theory and evidence to support the research questions and hypotheses. An extensive search for articles on influence and power in organizations was conducted. Search words included "information technology" influence" "power" "intraorganizational power" "department" and "departmental influence." The sources searched included various online databases of peer reviewed journals, including *Academic Search Premier*, *Business Source Premier*, *EBSCO Host* and *Proquest Central*, for articles which addressed the intraorganizational influence and power. Several studies investigated the dynamics of influence and power in organizations during 2000-2009. Searches using other key words including "impact," "bottom-line," "IT," "information technology," "department," and "function" resulted in a list of research articles investigating the impact of financial investments, budget allocations, IT processes, and IT artifacts on the firm's financial and new product development performances. However, there were no IT function level studies during this period focusing exclusively on the IT department's influence and power.

Although research conducted during the past nine years did not focus specifically on the IT department's influence and power within the firm, the findings of these researchers regarding the dynamics of influence and power in organizations informed the objectives of the current study. The following review examines research articles published within the last nine years pertaining to influence and power in order to develop theoretical support for the notion that accountability, innovativeness, customer connectedness and collaboration do exist in organizational processes and shape influence and power. In this section, a review of studies published during the last decade is presented. In the next section, research publications focusing on IT department's influence and power are reviewed.

Based on the resource dependence model (Pfeffer & Salancik, 2003) that resource allocation and discretionary decision making are two necessary conditions for the exercise of departmental power, Welbourne and Trevor (2000) conducted an analysis of cross-sectional time-series data on 55 departments in a large public university to understand whether departmental power affected job evaluation. The basis of this study was that a job evaluation is a discretionary decision as well as allocation of resources. Departments with more power are better at acquiring what they want (Welbourne & Trevor, 2000). The authors found that departmental power consistently predicted the number of new positions and position upgrades departments received. Study results also indicated that departments with higher relative power had greater effects on resource allocation. Welborne and Trevor (2000) study found that when the position power was higher, the department that had that position also gained higher power.

Although the position power may be low for the IT department in that it may not report to the CEO, the ultimate position of power, on the other hand, because of the power of the positions the IT department reports to, such as the chief financial officer or chief operations officer, the IT department is, in general, successful at getting the budget and resources it needs to acquire hardware, software, services, and people resources. However, when the IT department attempts to implement new hardware, software, and services, it often faces resistance from other departments within the firm. The IT department may not have the influence and power to implement the change. Another possible explanation for such resistance to change from other departments is the loss of power, which is generally characterized as not wanting to leave the comfort zone, which the other departments perceive. Goltz and Hietapelto (2002) pursued this line of thinking and applied the strategic contingencies theory of intraorganizational power to understand resistance to change resulting from loss of power. An example of a situation in which direct control enjoyed by individuals taken away as a result of change was when Michigan Technological University changed its IT infrastructure from a decentralized desktop PC environment to a centrally managed system requiring no desktop administration (Blumenstyke, 2001). With the new system, individual PC users lost much of their power to control computer usage to the systems administrators. Many staff members, faculty, and students resisted this loss of direct control over computing resources. It is also likely that some of the resistance was based on the perception the new system would take more time to use or learn to use. Externally-imposed requirements to learn a new system also serve to erode, at least temporarily, workers' choices about how to allocate their time, another valued resource in organizations. From the current study perspective, the IT department implicitly acts as an agent of change by implementing new information communication technologies. Non-IT departments may resist supporting the IT department for fear of losing their own power regarding computer and software usage. The current study hypothesized that collaboration with other departments within the firm has a positive effect on the IT department's influence and power. The study conducted by Goltz and Hietapelto (2002) supported this hypothesis by its conclusion that collaborative approaches amongst individuals and departments created opportunities for sharing power or expanding existing power, which in turn, could increase, rather than decrease, power for the departments.

How does the capability to collaborate with other departments increase IT department's influence and power? The study conducted by Peiro and Melia (2003) addressed this question for guiding this study. The authors surveyed 155 respondents from 32 different organizations operating in various industry types and analyzed the data using principal components analyses with varimax rotation and found support for their hypotheses that while formal power is unidirectional, informal power is reciprocal. While the manager, a formal power holder due to his or her position, could exercise influence on the subordinate, the subordinate might not have the ability to influence the manager. On the contrary, informal power holders influenced each other. The authors also found that higher levels of informal power in a group resulted in less frequent conflicts whereas higher levels of formal power resulted in more frequent conflicts. These findings provided indirect support to the argument in the current study that, although the IT department may be distant from the positions of power, by collaborating with other departments within the firm, the IT department could increase its informal influence and power within the firm. Through such informal influence and power, the IT department might experience less frequent conflicts with other departments. The study results of Peiro and Melia (2003) also supported the notion that sharing influence and power within an organization might contribute to expanding the total amount of influence and power available to the organization reinforcing the view of organizational influence and power as a promoter of individual and group performance.

The current study hypothesis that collaborating with other departments within the firm has a positive effect on the IT departments' influence and power within the firm is directly and indirectly supported by the preceding three studies by Welbourne and Trevor (2000), Goltz and Hietapelto (2002), and Peiro and Melia (2003). However, as depicted by the study conducted by Doolin (2004), there is also the possibility that collaborative behavior may lead to the increase of influence and power of the other non-IT departments with whom the IT department collaborates. In a case study analysis of the implementation of a large information system to monitor and scrutinize clinical activity in a New Zealand hospital, Doolin (2004) found that while, on the one hand, an information system might help enhance management control of the organization, on the other hand, the same information system could also confer more influence and power to those over whom control is attempted, by making available more information and a legitimate ground for action and discussion with the organization. In the case study, Doolin (2004) found that, contrary to management expectations, hospital doctors resisted the use of information produced by the system questioning its soundness or using it as a justification for additional resources. These results offer some possible explanations for the low influence and power status of the IT departments in organizations. The information generated by the IT systems could be used by the non-IT departments not only to gain influence and power but also to challenge the IT department's credibility. For example, while an enterprise resource planning system might help the firm improve its operational performance, it could also provide detailed information on the cost of IT. Knowledge about the cost of IT could empower the non-IT departments to challenge the financial outcomes of the IT department's plans legitimately. If the IT department is unable to offer satisfactory explanations of the financial outcomes of its plans, such challenges may result in loss of influence and power for the IT department.

While Doolin's (2004) study showed the possibility that the non-IT departments could use information to gain influence and power thereby minimizing the IT departments' influence and power, Ahituv and Carmi (2007) sought to find empirical proof for this argument. Based on a survey of 3591 potential respondents in 845 companies in Israel and 380 completed responses for a 10.6% response rate Ahituv and Carmi (2007) measured two types of power namely perceived power and participation power, and analyzed two types of information namely conveyed information and produced information. Results indicated that information affected departmental influence and power in organizations. The authors claimed that the results of their study proved that information conferred influence and power to organizational departments and, therefore, was an instrument to increase or sustain influence and power. From the perspectives of accountability, innovativeness, customer connectedness, and collaboration with other departments, the IT department engages in interpersonal interactions with the non-IT departments and in that process generates and holds various types of information. For example, the accountability behavior could generate information regarding financial outcomes of plans; innovativeness could generate information pertaining to new IT solutions; customer connectedness could generate specialized information about specific customers. However, possession of any information is not necessarily a source of influence and power.

All information might not confer influence and power; only valuable information could do so (Pfeffer & Salancik, 2003). In their study Ahituv and Carmi (2007) considered only frequency of information produced and conveyed and not whether the information was critical. For example, marketing information is valuable if forecasting demand for products is difficult. If the firm could easily sell its products and services, frequently collecting marketing information might not be useful and, therefore, might not have the ability to confer influence and power. This was further supported by the two experimental studies conducted by Baldwin, Kiviniemi, and Snyder (2009) to test whether having information about another person could be a source of influence and power in interpersonal interactions. In the first experiment, some participants had informational advantage and some participants did not have an informational advantage. The authors randomly selected the participants to tell each participant about the informational advantage. Results of this experiment showed that participants who had information that gave them an advantage reported higher perceptions of influence and power compared to participants who had information that did not give them an advantage. The authors attributed this to feelings of informational influence and power. In the second experiment, the authors examined the effects when participants had information that did not give them an explicit advantage. From the current study perspective, departments are made up of individuals and the interaction between two departments is the result of the interactions between individuals who make up the departments. The findings of the two experiments could be applied to the current study to infer that it is possible for the IT department in a firm to have a higher perception of influence and power because of its perceived informational advantage. The IT department has access to information – information pertaining to the firms' business processes, such as the sales process, the purchasing process, the customer service process, or the manufacturing, warehousing, and distribution processes. Accumulation of such information can lead to useful knowledge about the organization. Knowledge is a significant input into the innovation processes (Andersson & Ejermo, 2005; Byrd, Lewis, & Turner, 2004) which leads to the question of whether innovativeness confers influence and power.

The current study developed and tested the theory that innovativeness of the IT department has a positive effect on the IT department's influence and power. Also, fewer conflicts resulting from collaborative behavior combined with greater distance from positions of formal influence and power could have positive effects on IT innovativeness (Thatcher, Srite, Stepina, & Yongmei, 2003). The innovativeness of the IT department manifests through behaviors such as solving the business process problems encountered by non-IT departments by exploring and implementing new software solutions to improve business performance. For example, the IT department may explore new customer relationship management software to improve the firm's sales management process; top management of a firm may task the IT department to implement an enterprise resource planning (ERP) system at significant costs to reengineer business processes and automate transactions. Such innovativeness could create greater interdependence between the IT department and other non-IT departments.

Using multiple regression analysis, Gattiker (2007) tested survey data from manufacturing and marketing departments of 107 manufacturing plants running ERP and found support for the argument that the benefits a firm derives from the ERP systems depends both on interdependence between departments and the degree of the interdependence. These findings addressed two specific aspects for guiding and supporting the current study. First, when many departments depended on the IT department it would lead to the pervasiveness of the IT department. Based on the strategic contingencies theory, greater pervasiveness would lead to increased influence and power (Hinings et al., 1974). Second, when many departments depended on the IT department to implement an IT system, such as the ERP system, and when the firm derived benefits from the systems based on the degree of interdependence, it would increase the credibility of the IT department making it even more influential within the firm. However, the credibility of the IT department often comes under fire due to failed IT system implementation projects which might result in diminished influence and power for the IT department (Iacovou & Dexter, 2005).

Grover, Henry, and Thatcher (2007) argued that there was a credibility gap between the IT department and the top management team. They further argued that the CEOs were taking more control of the IT initiatives and, therefore, the IT departments felt expendable due to the availability of outsourcing as an option to the top management team to obtain the needed IT services (Grover et al., 2007, p. 80). Additionally, the IT departments were being blamed for failures relating to IT decisions even though top management teams were the ones making those failed decisions. Grover, Henry, and Thatcher (2007) surveyed 89 senior IT executives (CIOs or VPs of IS) across a diverse set of industries to answer three simple questions: who made major IT decisions, who was held accountable for them, and did that affect the relationship between the IT department and top management team. Results indicated that top management might be making unpalatable IT investment decisions, while leaving IT management accountable for the success or failure of those decisions. This, in turn, increased the gap between the IT department and the top management team as perceived by the IT department. This negative perception, in turn, affected the quality of the relationship between the top management team and the IT department. From the current study perspective, a noteworthy point from the Grover, Henry, and Thatcher (2007) findings is that if the IT department wants to enhance its influence and power by gaining the right to make strategic decisions, it must also be prepared to show accountability for those decisions.

The current study hypothesized that accountability has a positive effect on the IT department's influence and power, but the question was how the IT department could achieve such accountability. Howcroft and Light (2006) provided a possible answer by a case study of the interplay of influence and power exercised by the IT department personnel, managers, and the chief executive of a small firm in the context of packaged software selection. Their empirical study showed that the role of the IT department within the firm was expected to be negotiating a range of financial and contractual issues, both with external IT vendors and internal financial decision-makers. At the same time, the IT department was expected to appease users, legitimize the change process and endorse the technology as the driver of the change. These were calls for the IT department's accountability, innovativeness and collaboration with other departments: accountability demonstrated through negotiating financial and contractual issues; innovativeness exhibited through creative problem solving and appeasing the users; collaborative behavior through cooperation and negotiation with internal decision-makers, IT users and external vendors. Cooperation and negotiations occur every day in organizations between individuals and departments. Workplace relationships and work practices in today's complex organizations require individuals and groups to cooperate and negotiate in order to accomplish their goals and objectives. Negotiation occurs when an individual or a department interacts with another individual or department. Kim, Pinkley, and Fragale (2005) pursued the notion that influence and power affects a negotiator's quality of performance. To study the dynamics of influence and power in negotiations, these researchers dissected power into four parts:

- Potential power - the basic capacity of negotiators to get benefits from their agreement.
- Perceived power - negotiators' assessments of each party's potential power.
- Power tactics - behaviors designed to "use" or "change" the power relationship.
- Realized power - the extent to which negotiators have claimed benefits from their interaction.

Kim, Pinkley, and Fragale (2005) reviewed existing power dependence literature to propose that influence and power perceptions drove tactical decisions, which could influence negotiators' mutual dependence and mediate the relationship between potential and realized influence and power. The authors considered a number of power-use and power-change tactics to develop an understanding of how negotiators might either lose influence and power or accumulate influence and power as a result of their negotiations. The authors found that the extent to which negotiators realized influence and power from the focal interaction affected their potential influence and power in future interactions. From the perspective of IT departments' influence and power, the extent to which the IT department realizes influence and power through its collaboration and negotiation with other departments is cumulative. In other words, in the process of negotiating and collaborating with the users in other departments, with each negotiation the IT department creates an expectation for a finished product or solution to a business problem (Hirschheim, Porra, & Parks, 2003). These expectations also reflect on the IT department's own innovativeness. Users in other departments exchange stories about their relationship with the IT department and these conversations influence the users' perceptions and expectations of the IT departments' innovativeness (Hirschheim, Porra, & Parks, 2003). Each positive story or conversation about the IT department can positively affect the IT department's influence and power with other departments within the firm.

The preceding discussion explored the effect of accountability, innovativeness, and collaboration on influence and power within the firm. The customer connecting capability of the IT department is premised on the observation that the IT department is called upon to coordinate and implement information technology tools such as "data-mining tools to identify new market opportunities, websites to advertise and sell products directly to buyers, and partner relationship software to coordinate marketing programs with distributors" (Karimi, Somers, & Gupta, 2001, p. 129; Nakata & Zhu, 2006, p. 320). Customer connecting capability of the IT department is generated as a result of its interactions within and outside the firm. Customer management and marketing management departments spend a significant amount of money on information technology. Much of the IT tools acquired are thus aimed at improving the ability of companies to understand and fulfill customer needs. The IT department collaborates internally with other departments such as marketing, sales, and distribution to implement the tools and in doing so acquires information and develops unique perspectives about marketing and sales processes and customers (Karimi, Somers, & Gupta, 2001; Nakata & Zhu, 2006; Nakata, Zhu, & Kraimer, 2008). The IT department collaborates externally with suppliers, manufacturers, and distributors to implement electronic data interchange (EDI) systems "used to share easily information on inventories, production plans, new product designs, and purchase orders, improving logistics and speeding up market introductions" (Nakata & Zhu, 2006, p. 326). While collaborating with external organizations, during these implementation projects, the IT department also brings in its innovativeness and accountability skills in to the process. For example, to set up the EDI connection with customers the IT departments on either side of the connection have to collaborate to understand the nuances of the business processes such as the purchasing, inventory management, and shipping processes and resolve the problems to establish successful connections. During these collaboration and problem solving events, the IT department personnel develop unique perspectives about the customers (Nakata et al., 2008). While prospecting for new customers the sales department might seek out the IT department to bring its unique perspectives and expertise to help the sales process. For example, the prospective customer may have questions about automating business processes to achieve desired time to market goals; the sales department may be able to tell the prospective customer “yes we can do it,” but the IT department can articulate both the business process and information technology perspectives in ways that may gain the prospective customers’ confidence resulting in winning the new business (Karimi, Somers, & Gupta, 2001). Winning new customers increases firms’ revenue, which puts the sales department in a positive light with the top management team, thereby indirectly positively affecting IT departments’ influence and power.

From the preceding discourse, contemporary research answers the research question what factors affect IT departments’ influence and power by supporting, directly and indirectly, the notion of accountability, innovativeness, customer connectedness, and partnering with other departments as antecedents of IT departments' influence and power within the firm. Insights will now be developed to understand the consequences of IT departments' influence and power on firms' business performance.

In this study, the consequence of the IT department's influence and power was premised on the observation that the IT department participates in the firm's IT investment decisions which might affect the firms' business performance. This researcher argued that having influence and power was a prerequisite for participation in IT investment decisions. Xue, Liang, and Boulton (2008) pursued this line of thinking and conducted multiple case studies of 58 IT investments and related decision processes across six state-owned Chinese hospitals over a 30 month period between 2002 and 2004. Their data gathering approach included semi-structured interviews with multiple participants, field surveys, archival records, field notes, site observations, and organizational documents. The authors found that in hospitals with high levels of centralization, the top management team played a major role in initiating IT projects as well as in the development and approval of the projects. On the contrary, in hospitals with higher levels of decentralization, other actors including the IT department, the administrative departments, and the health care professional departments played key roles in initiating and developing IT project proposals. These findings suggested that centralization is positively related to top management control and negatively related to other departmental, including the IT department, control during the initial stages of IT investment proposals. The authors also found that IT departments, which had control over decision making during the development stages of the IT investment decision process, had higher levels of influence and power. Conversely, IT departments with low levels of influence and power had little say during the development stage in IT investment decisions. Only when their influence and power was high could the IT departments initiate investment proposals. The study findings suggested that the relative strength of IT department's influence and power was a determinant of whether the department played a major role in strategic decision making.

Top management ignores the IT department when the IT department has low levels of influence and power. The strength of IT department's influence and power depends on its involvement in IT investment decision-making processes. Preston, Chen, and Leidner (2008) argued that the level of authority of the CIO to make strategic decisions had a direct effect on the IT department's contribution to firm's performance. The authors developed a model of antecedents of the authority of the CIO to make strategic decisions and tested the model using structural equation modeling techniques based on data collected from a sample of 174 CIOs and business executives of various industry types. The results indicated that "organizational climate, organizational support for IT, the CIO's structural power, the CIO's level of strategic effectiveness, and a strong partnership between the CIO and top management team" (Preston et al., 2008, p. 605) had a direct effect on the extent to which the CIO had the authority to make strategic decisions within the organization. The results also suggested that the license to make strategic decisions within the firm was an indicator of whether the IT department could affect firm performance and the degree to which CIO could influence the IT department's contribution to firm performance.

Influence and power affect organizational outcomes (Tjosvold & Wisse, 2009, p. 3). CEOs are recognized as the main architects of organizational strategy to produce specific outcomes (Bigley & Wiersema, 2002). While some researchers (e. g., Norburn, 1989; Wheelen & Hunger, 1990) argued that the CEO was "THE corporate leader" (Norbutn, 1989, p. 2) who "set[s] the tone for the entire corporation" (Wheelen & Hunger, 1990, p. 69), other researchers (e.g., Finkelstin, 1992; Wiersema & Bantel, 1992) have argued that the top management team (TMT) has significant influence and power to define organizational strategic change, and produce specific outcomes such as firm performance, diversification, and acquisition activity. The CEO and the TMT (of which the CEO is the central member) occupy positions of unique influence and power (Pfeffer, 1992) in the firm and make strategic decisions, which imply that, to make strategic decisions, the IT department and the CIO must have influence and power within the organization. In order to have high levels of influence and power, the IT department and the CIO must be a member of the TMT and be participants in strategic decision-making. In most of today's organizations, the CIO reports either to the chief finance officer (CFO) or another member of the top management team (TMT), not directly to the CEO (Peppard & Ward, 1998). This indicates that, in most organizations, IT cannot acquire hierarchical position power. The TMT member, to whom the CIO reports, may bring the CIO into play only for information, but may or may not include the CIO in the strategic decision-making processes of the organization. This leaves IT in a position of low levels of power even though IT performs activities that are important to the organization (Avison, Cuthbertson, & Powell, 1999). The alternative is to acquire power through developing other capabilities identified in this study namely accountability, innovativeness, customer connectedness, and partnering with other departments. This study hypothesized that, by developing these capabilities, the IT department could earn respect at the top management level which might result in strong partnerships between the IT department and the TMT, which, in turn, might enhance strategic decision-making opportunities for the IT department.

The preceding discussion reviewed literature on influence and power in organizations to develop insights on how the antecedents might help to develop influence and power. Also, the discourse suggested that strategic decisions affect firm performance, and, therefore, to affect firm performance the IT department must participate in strategic decision making. Influence and power is a prerequisite to participate in strategic decision making, thus leading to an indirect relationship between IT departments' influence and power and firm performance. In the next section, a review of research focusing on the subunit or department in a firm and also specifically on the IT department's influence and power within the firm is presented.

Review of Literature on IT Department's Influence and Power

This researcher found nine studies, summarized in Table 1, conducted during the last three decades which tested the original theory of intraorganizational power developed by Hickson, Hinings, Lee, Schneck, and Pennings (1971). Six of them examined the IT department's influence and power within the firm.

Table 1

Literature Focusing on Department Level Study

No.	Authors (Year)	Level of Analysis (Industry type)	Type of Study (Exploration)	Departments Included
1	Hinings et. al., (1974)	Intra-organizational (Manufacturing: Breweries)	Field study/Survey research (Hypotheses testing)	Engineering, Marketing, Production, Accounting
2	Saunders (1981)	Intra-organizational	Non-empirical (Proposition development)	Information services
3	Saunders & Scamell (1982)	Intra-organizational (Manufacturing: Oil and Gas; Education: Universities)	Field study/Survey research (Hypotheses testing)	Production, Accounting/Finance, Engineering, Marketing, Computer Services; University Administrative Departments
4	Lucas (1984)	Intra-organizational (Manufacturing: Industrial containers, Electronic equipment, and Chemicals)	Field study/Survey research (Hypotheses testing)	Information services, accounting, engineering, marketing, production
5	Saunders & Scamell (1986)	Intra-organizational (Manufacturing: Oil and Gas)	Field study/Survey research (Hypotheses testing)	Information services, accounting/finance engineering, marketing, production
6	Lucas & Palley (1987)	Intra-organizational (Manufacturing: Industrial containers, Electronic equipment, and Chemicals)	Field study/Survey research (Hypotheses testing)	Information services, accounting, engineering, marketing, production
7	Cohen & Lachman (1988)	Intra-organizational (Healthcare Clinics)	Field study/Survey research (Hypotheses testing)	Medical (Physician), Paramedical (Nurses), and Administrative
8	Harpaz & Meshoulam (1997)	Intra-organizational (High Tech Electronics Manufacturing)	Field study/Survey research (Hypotheses testing)	Production, Sales & Marketing, R & D, Finance & Accounting, HR, Engineering, Customer Service
9	Lim (2007)	Intra-organizational (University)	Field study/Survey research (Hypotheses testing)	Information Services, Administrative

Hinings, Hickson, Pennings, and Schneck (1974) focused on the control of strategic resources as an indicator of potential influence. They tested their contingency theory model in five breweries and found that a department's relative influence and power was determined by a combination of three factors namely the department's ability to cope with uncertainty, its non-substitutability, and its pervasiveness.

Saunders and Scamell (1982) replicated Hinings et al's., 1974 study in six universities and four oil and gas companies. They found support in the university study but not in the oil and gas firms' study. They concluded that departmental power might depend on the type of industry and needed further research.

Lucas (1984) applied strategic contingency model of intraorganizational power to the IT department in 40 manufacturing firms. Although, his initial conjecture was that the IT department had higher levels of influence and power in these firms, the study's correlation and linear regression analyses results indicated that the IT department's influence and power was low relative to accounting, engineering, marketing, and production departments in these firms. Lucas (1984) suggested that the unexpected findings might be attributed to a lack of IT department's pervasiveness and concealment of the department's power in the 40 manufacturing firms studied.

Lucas and Palley (1986) studied 37 highly centralized manufacturing firms and, similar to the Lucas' 1982 study, found that the IT department's influence and power was low compared to the other departments. Lucas and

Palley attributed their findings to the highly centralized firms in their sample and the transaction processing systems which were perceived as secondary to the primary mission of the firms. Their findings supported the notion of pervasiveness as important in considering power.

Saunders and Scamell (1986) conducted a study of 17 manufacturing firms and obtained results similar to the studies conducted by Lucas (1984), and Lucas and Palley (1986). Cohen and Lachman (1988) studied a network of 30 clinics in a publicly owned healthcare organization in Israel. They found support to the study conducted by Hinings et al., (1974). Lim (2007) studied 95 university libraries and found that the IT department had more perceived influence and power.

Harpaz and Meshoulam (1997) studied 56 electronics high-technology firms in Israel and found that the R & D departments in high-tech firms had high levels of influence and power. Their study supported Hinings, et al's., intraorganizational power model.

In all the research studies discussed in the preceding review, departmental power was measured as "perceived power", that is, influence attributed to the department. In studies conducted by Hinings et al., (1974), Lachman and Cohen (1988), Saunders and Scamell (1982), and Saunders and Scamell (1986), power was measured as "participation power", that is, involvement in the decision-making process in the organization. Hinings et al., (1974) and Saunders and Scamell (1982) measured power also as "position power" that is formal legitimate authority. Lachman and Cohen (1988) measured power also as “power domain”, that is, the number of departments whose behavior is affected by a department in an organization. Lucas (1982) measured power also as “power contribution”, that is, the rank of the department according to its contribution to the organization’s profit. Saunders and Scamell (1982) measured power also as “committee participation”, that is, the participation of the department in the organization’s committees weighted with the importance of the committee. This dissertation research adopted the most commonly used operationalizations of power namely Perceived Power and Participation Power.

The previous studies on IT department’s influence and power were conducted in the 1980s. When Lucas (1982) and Lucas and Palley (1986) conducted their studies, the IT departments in the sample manufacturing firms were not strategic units in their organizations. The IT departments in those firms did not participate in strategic decision making and they did not represent activities that generated revenue for the firms. Additionally, Saunders and Scamell’s (1986) study indicated that IT managers did not have the necessary skills to participate in the politics of the organization. The main implication of Lucas (1982) and Saunders and Scamell (1986) studies, however, was that they only showed the power rank of IT departments in the manufacturing, oil and gas companies at a certain period in time. Since that time the technology landscape has changed dramatically. Costs of computers have fallen, firms have moved away from centralized mainframes to distributed computing, Internet is used to connect world wide locations, communication using email and other electronic media has increased, other departments do not have to depend on the IT department for their reports for batch jobs to run at night. Firms being able to afford computerization have grown considerably. These events may have led to different influence and power dynamics than those cited in the studies conducted by Lucas (1982), Lucas and Palley (1986), and Saunders and Scamell (1986).

Implications of Theory for the Antecedent Variables

Although previous studies explored the sources of departmental influence and power, and found that the IT department was not perceived as having influence and power, the factors which affected the IT department's influence and power were only speculative. Some researchers (e. g., Markus & Bjorn-Andersen, 1987) also indicated that the IT department had influence and power but was not using it. Pfeffer and Salancik (1977) offered a rather basic definition of organizational power, which suggested that it was an ability of actor A to influence actor B to do something B would not otherwise do, and hence induced an outcome that A desired and which was to A's advantage. Saunders (1981, p.433), on the other hand, offered a more formal and pluralistic definition of power at the organizational level as "the capability of one subunit, either through formal position or through actual or perceived participation in organizational activities, to exert influence on another subunit to act in a prescribed manner". This definition of power at the department level is relational and more appropriate for the current study. Implicit in this definition of subunit (or department) power is sources or bases of power that affect the IT department's influence and power within the firm.

Departmental influence and power is not directly observable and is difficult to measure. Therefore, this study deduced the IT department's influence and power from measurable determinants and consequences (Hills & Mahoney, 1978; Pfeffer, 1981). Moreover, because each single measurable power correlate was somewhat inadequate, the superior approach was to use an index that demonstrated convergence among the power determinants and consequences (Pfeffer, 1981). Accordingly, this study combined the following four antecedents and two definitional components of IT department's influence and power and their consequences to create such an index. This researcher argues that the IT department's capability to participate in organization's activities is the major source of its influence and power within the firm. The four capabilities, which are the antecedents, positively affecting and acting as sources of the IT department's influence and power are accountability, innovativeness, customer connectedness, and collaboration (or partnering) with other departments within the firm. The two definitional components of IT department's power are perceived power and respect at the top management level. The theory is, regardless of the IT artifacts such as specific computer equipment and applications, used in the firm, participation in these four activities has a significant, positive effect on the IT department's ability to influence within the firm.

Implications for Accountability

Organizations practice accountability as a means to deal with department leaders who are considered as a problem by punishing them for the problem or telling them that "this won't be tolerated" and what will happen if the problem happened again (Seiling, 2001, p. 49). On the other hand, "constructive accountability" results in consultative opportunities for the department (Seiling, 2001, p. 50). A consultative department, according to Seiling (2001), is credible, is able to communicate needs, expectations, and expertise, and works cooperatively with other departments (p. 50). Constructive accountability supports partnering efforts by fostering open communication. Without the consultative open communication as part of accountability, all participating departments are in an anxiety state of seeking to "convince and control" (Seiling, 2001, p. 50) and tend to shut down. Conversations of accountability which include information and stories of successes, what worked well and why, what would be changed to make it even better, and so on could increase and sustain the department's credibility. From the perspective of contingency theory of intraorganizational power (Hinings et al., 1974), the pervasiveness of the department that practices constructive accountability increases thereby increasing its influence and power. As a consultative member of the firm, the department is a credible business partner able to communicate and work with all other departments thereby increasing work flow activities and dependence. This will increase the department's influence and power.

The IT department itself is to blame for the lack of understanding of other departments regarding the value that IT brings to the firm (Ragowsky et al., 2008). In other words, the IT department is accountable for the perception of its lack of influence and power within the firm. The IT department must practice constructive accountability by interacting with other departments as a consultative business partner as described above in ways to identify their information needs, without talking down to them by mentioning the latest technology and technical development (Ragowsky et al., 2008).

Based on the preceding discussion of constructive accountability, it is reasonable to theorize that accountability increases the IT department's influence and power within the firm. Accountability that includes positive achievements, as well as lessons learned from the experiences, provides opportunities for giving and getting support thereby increasing one's influence and power (Seiling, 2001, p. 51). For example, the sales, production, manufacturing, and R & D departments are often expected to speak about their achievements in financial terms such as sales revenue, potential volume of new products in terms of dollars, costs of materials, and so on. The language used by these departments is common in financial terms. The IT department is generally perceived as expenditure for reasons discussed previously, and the language used by the IT department is more technical. While the sales, production, and R & D departments are expected to link their activities to financial outcomes, the inability or frequent unwillingness and reluctance of the IT department to do so may be viewed as lacking accountability thereby causing distrust. Other departments may not understand the financial outcomes of the IT department's activities. This may heighten the possibility of hostility of the other departments towards the IT department. One way to overcome this treatment is for the IT department to share the financial outcomes of its plans with other departments. If other departments perceive that the IT department is able to link its activities to financial out comes and shares the information, then they may come to believe that the IT department is also held to the same expectations as the others. This increases the credibility of the IT department with others. From a consultative perspective if the IT department is perceived as someone that cares about the quality of its services to the internal user community, the other departments are more likely to listen to the IT department, participate in discussions which in turn increases the pervasiveness of the IT department, resulting in enhanced influence and power status of IT. Based on the preceding discussion, this study hypothesized that the IT department's capability for constructive accountability was an antecedent of IT department's influence and power. This is depicted in Figure 6 describing the notion that accountability itself cannot be observed, but the accountability behavior becomes visible through articulations of activities in financial terms and internal customer service activities, which can be observed and perceptions can be developed. These behaviors lead to the pervasiveness of the IT department – the other departments include IT in their activities, seek the IT department's help to resolve problems, and the IT department is in the work flow activities of other non-IT departments which increases the IT department's pervasiveness which, based on strategic contingency theory and resource dependence theory, increases influence and power.

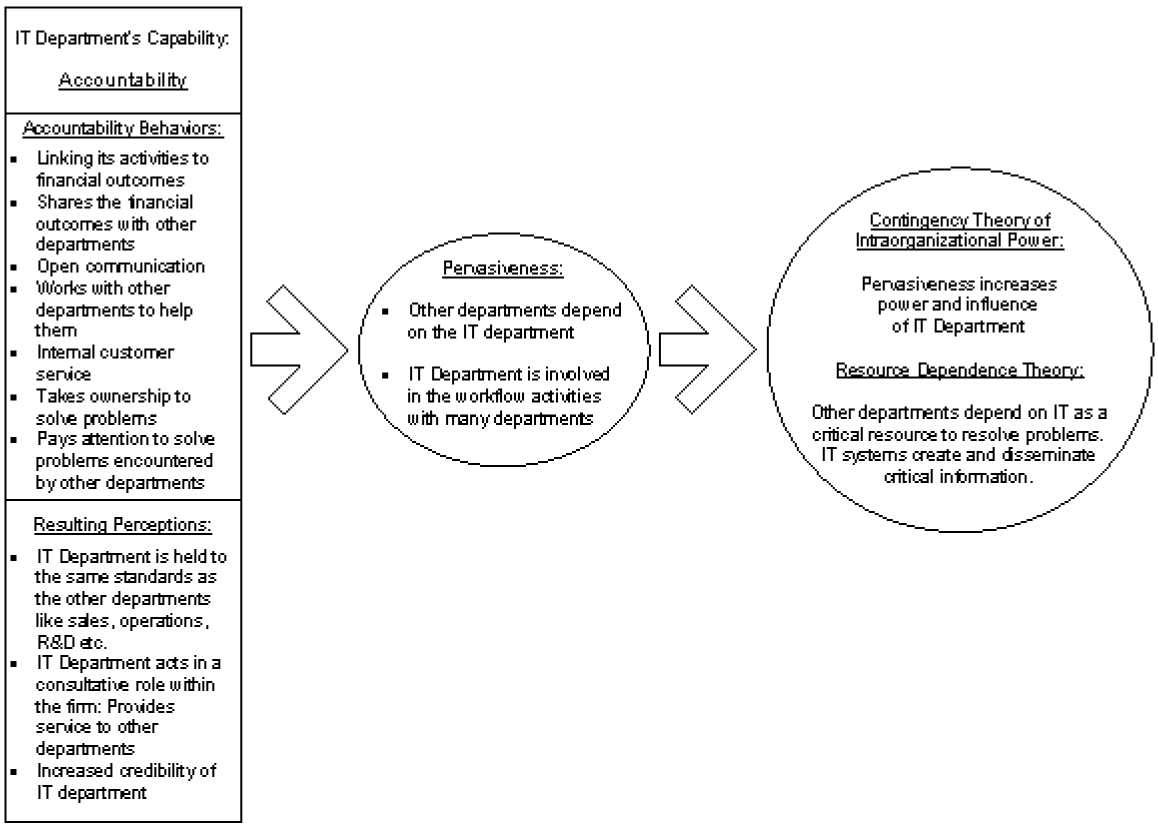

Figure 6. Accountability leading to influence and power.

Implications for Innovativeness

The capability to innovate has always been considered a contributor to organization's success. In organizations, innovative individuals and groups are admired, they are respected for their ability to create new products or solve difficult problems using innovative means, which in turn contributes to influence and power of the individuals or groups. Within the organization, successful innovators can often get what they want – financial resources, cooperation and support from others, and so on. Therefore, in this study, the innovativeness of the IT department is considered a contributor to the IT department's perceived influence and power.

In today's enterprises, business models and their component processes are increasingly IT-enabled, meaning information technology is shaping "more parts of the business and in more fundamental ways" (Fichman, 2001, p. 428). Innovations in information communication technologies such as enterprise resource planning, data warehousing, electronic commerce have restructured the way companies do their business. Complexities of IT systems and business processes, coupled with the global nature of businesses, present implementation challenges for the IT department (Fichman, 2001, p. 429) demanding more creativity from the IT department. The combined effect of IT innovation and implementation complexity puts the IT department in the path of a multitude of activities with the other departments thereby increasing its pervasiveness resulting in enhanced influence and power status (Hinings et al., 1974; Lucas & Palley, 1986). The IT department is called upon to be a creative problem solver, act as a consultative partner to help the other departments become adept at using the IT solutions to get the information they need. This increases the IT department's interactions with the other departments resulting in dependence of the other departments on the IT department to solve their problems. Constructive accountability plays a role here in enhancing the IT department's innovativeness.

In this situation, the other departments perceive the IT department as having higher levels of influence and power. Based on the preceding discussion, the current study hypothesized that the IT department's innovativeness was an antecedent of its influence and power within the firm. This is depicted in Figure 7.

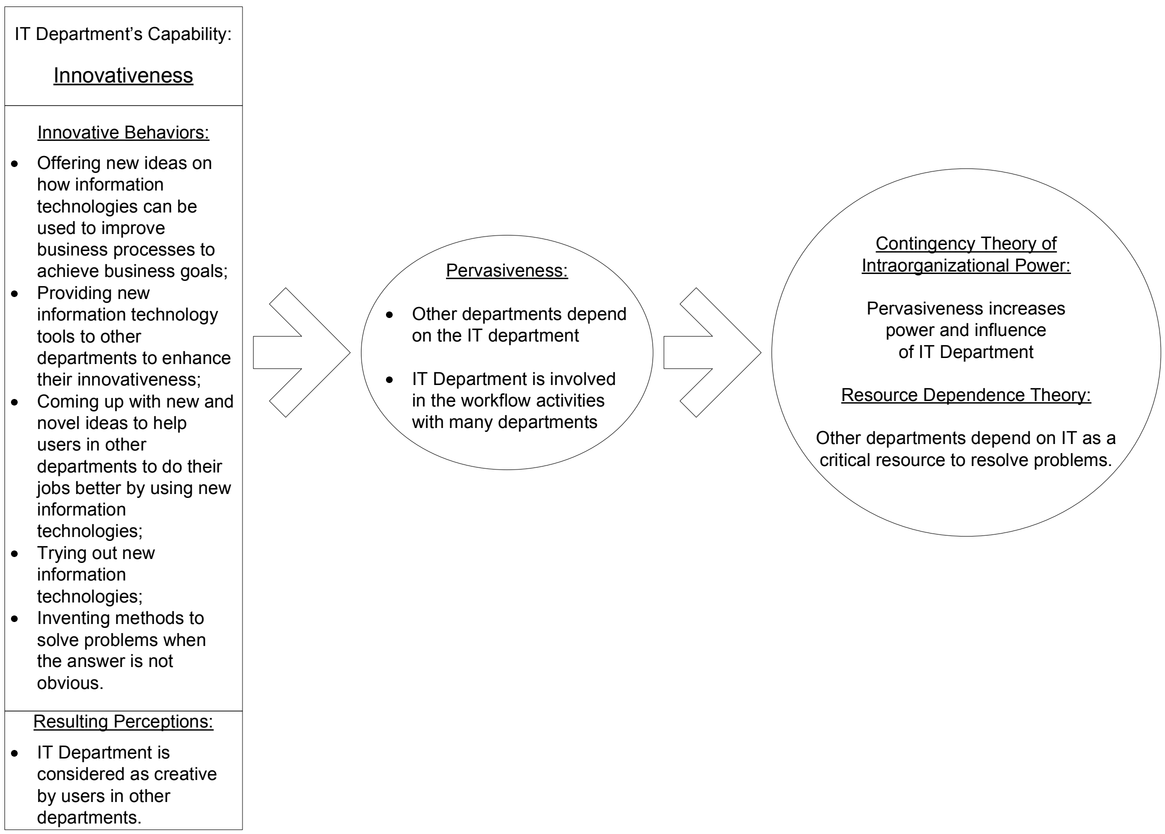

Figure 7. Innovativeness leading to influence and power.

During the implementation of the IT innovations, the consultative behavior of the IT department could increase its interaction with other departments. This, in turn, would create opportunities for the IT department to be more innovative to solve problems encountered by the other departments as they assimilate the new IT solution. The problem solving capability and consultative behavior could lead to respect for the IT department thereby increasing its influence and power. Also, the innovativeness of the IT department could lead to accountability. The very nature of creative problem solving calls for a consultative partner behavior leading to constructive accountability as described previously. Thus, the IT department's innovativeness was hypothesized as an antecedent of IT department's influence and power.

Implications for Customer Connectedness

Customer connectedness was an IT department level perspective in this study. The notion of customer connectedness is a synthesis of customer orientation and market orientation concepts discussed in marketing literature (Nakata, Zhu, & Kraimer, 2008; Frasquet, Cervera, & Gil, 2008). Thus, the conceptualization of customer connectedness of the IT department has some elements similar to that of market orientation and customer orientation. Customer connectedness is the IT department's "ability to identify, analyze, understand, and meet customer needs" (Nakata et al., 2008, p. 489). More significantly, customer connectedness is a set of IT activities including the gathering, sharing, and responding to customer information, that reflects proactive attention to customers (Deshpandé, Farley, & Webster Jr., 1993; Gatignon & Xuereb, 1997).

Customer connectedness also encompasses coordinating with other functional departments within the firm (Narver & Slater, 1990; Slater & Narver, 1998; Slater & Narver, 2000). These characteristics position the IT department in many workflow activities with other departments within the firm. If a customer wants to communicate via electronic transactions, such as EDI and Rosettanet messaging, the IT department is involved in coordinating with the sales, production, and purchasing departments within the firm and with the vendor relations departments on the customer side to define the message configuration, design, and implementation. If the customer needs special reports, the IT department will need to coordinate with the other internal departments to define, develop, and implement the reports. The more the IT department is involved in these customer-related activities, the more pervasive its role becomes. If a problem occurs, say for instance customer cannot send a purchase order, the IT department will be a critical resource required to solve the problem. Based on the preceding discussion, customer connectedness of the IT department is an antecedent of the IT department's influence and power. This concept is depicted in Figure 8.

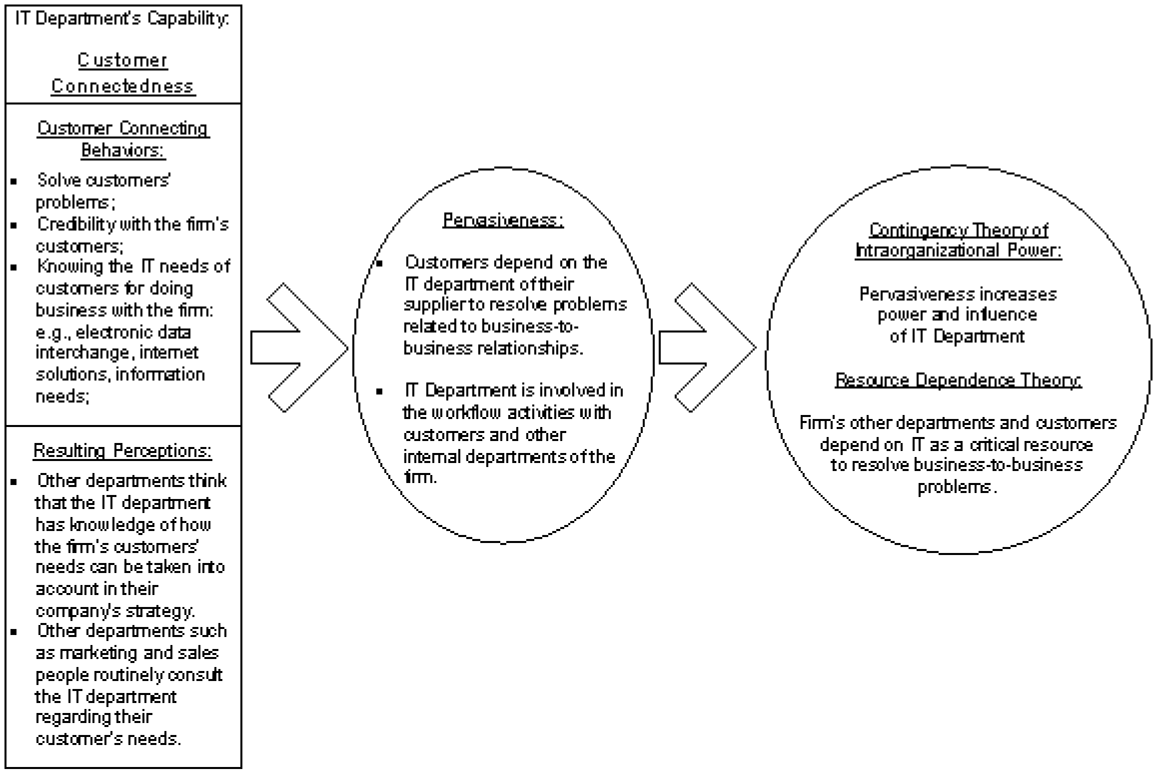

Figure 8. Customer connecting capability leading to influence and power.

Implications for Collaborating (Partnering) with other Departments

In the organizational dynamics, departments have goals, and they depend on one another to achieve their goals. The Marketing department needs the R & D department to help with the development of the latest products and services for which there is market-demand, the sales department needs the IT department to help with processing orders quickly, the production department needs the purchasing department to help with purchasing parts to manufacture the products, the production and purchasing departments need the warehousing department to help with stocking the materials so that customer demands could be met, production, purchasing, sales, warehousing, and finance departments need the IT department to help with implementing systems to automate processes and transactions, generate reports and provide information. This interdependence amongst various departments in an organization creates situations for participation, influence and conflict. Influence is needed to resolve conflict and participation is needed to bring influence into action (Robey, Smith, & Vijayasarathy, 1993). Given the high involvement of the IT department in an organization's work flow and dependence on computing operations, contingency theory suggests that IT departments are likely to possess more influence and power in organizations. Although Lucas (1982) and Saunders and Scamell (1986) tested this theory and found that other departments did not generally perceive IT departments as having influence and power, Markus and Bjorn-Andersen (1987) suggested the possibility of the IT departments having power but not using it. The strategic contingencies theory, like the resource dependence theory, explains the power in terms of its sources, that is, the constituents that facilitate actors to obtain it and hold it (Pfeffer, 1981; Markus & Bjorn-Andersen, 1987). Pfeffer (1981), however, suggested that the sources of power and the use of power are not necessarily closely related (Markus & Bjorn-Andersen, 1987): “[S]ome social actors who might be potentially powerful may not recognize the determinants [of power] or the fact that they possess them” (Pfeffer, 1981, p. 48).

By combining the ideas that the IT department has power but may not be using it, and participation in the organizations workflow (pervasiveness) creates situations to exercise influence to resolve conflicts, it is reasonable to theorize that the collaborating capability of the IT department, or the ability to collaborate with other departments has a positive effect on the IT department's influence and power within the firm. Research supports the theorizing that collaborative influence can be effective and mutually enhancing (Tjosvold & Wu, 2009). In an experiment conducted by Tjosvold and Sun (2001), collaborative influence communicated respect and encouraged openness to the influencer's position as well as the influencer as a person. The same experiment showed that controlling influence was considered disrespectful, resulted in closed-mindedness and rejection of the influencer. This also supports the notion of constructive accountability. Thusly, the IT department's capability to partner, or collaborate, with other departments within the firm is an antecedent of the IT department's influence and power. This concept is depicted in Figure 9.

Also, constructive accountability as a result of consultative behavior, innovativeness capability as a result of creative problem solving, customer connectedness as a result of innovativeness in solving customer problems are all intertwined in creating a collaborative behavior. Therefore, the four antecedents are correlated affecting the IT department's influence and power individually and jointly.

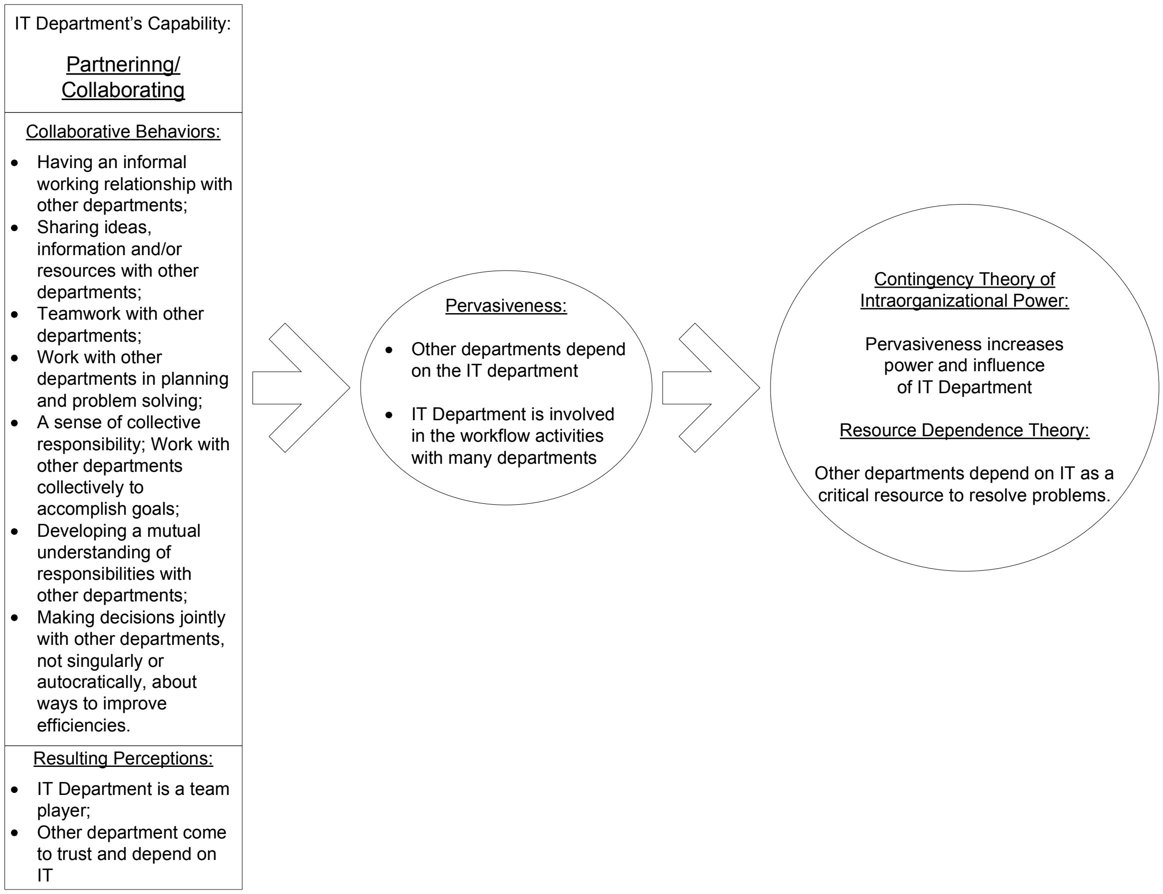

Figure 9. Partnering leads to influence and power.

Consequences of IT Department's Influence and Power within the Firm

Over the last decade, technological complexity reduced user satisfaction with the IT department, with the information they received from the IT systems, "along with respect for the IT personnel" (Ragowsky, Licker, & Gefen, 2008, p. 24). Vendors promised that their hardware and software could do whatever users wanted, but users found those were empty promises. Often users were frustrated because "technology actually made it more difficult to generate information" (Ragowsky, Licker, & Gefen, 2008, p. 24). So, many of the business departments including marketing, engineering, manufacturing, finance even today fail to attain the business benefits from the technology their organization already has. Consequently, the leaders of those departments may tend to reduce their IT spending, treating IT as purely technical support, "ignoring the information component, the I in IT" (Ragowsky, Licker, & Gefen, 2008, p. 24). Therefore, in this study, the IT department's influence and power as the dependent variable is operationalized based on the notion of perceived power and respect at the top management level. That is, the opinion of the other departments regarding the IT department is based on a perception that the IT department delivers business benefits from the technology that they help install which in turn makes the IT department have higher levels of influence and power. The perception that the IT department delivers business benefits also earns respect at the top management level which in turn increases the relative level of the IT department's influence and power. The perception that the IT department has influence and power manifests in the interactions of the IT department with the other departments and the top management. This phenomenon is not specific only to the IT department. Other departments experience similar dynamics within the firm. If the sales department brings in more revenue to the firm, it will be viewed favorably by the top management; if the R & D department delivers highly successful new products, it will be highly respected by the top management. On the contrary, if these departments fail to generate revenue or deliver successful products, their influence and power within the organization will diminish. A department that is respected by the top management also develops influence and power. In summary, the notion of influence and power of the IT department is operationalized in this study as a combination of two definitional components namely, respect at the top management level and the other departments' perception of the IT department's power (perceived power).

Consequences for Firm's Business Performance

The IT department's capabilities such as accountability, innovativeness, customer connectedness, and partnering with other departments have a positive effect on the IT department's perceived influence and power. The relative level of influence and power depends on the degree of the effect of these antecedent variables. Higher accountability effects higher influence and power, higher innovativeness means higher levels of influence and power, and so on. When the IT department has influence and power, it implies that the top management and the other departments are satisfied with the services they are receiving from the IT department, and are benefiting from their interactions with the IT department. As a consequence, the other departments are able to deliver higher levels of performance. There is an extensive literature describing the firms in various industry types benefiting by implementing information communication technologies. The IT departments in these firms have enabled superior customer service by implementing IT systems and automation to transform marketing, production, sales, and R & D departments (Karimi, Somers, & Gupta, 2001). By sharing information in a timely manner, by cutting costs, by reducing time to market and other factory cycle times, these firms were able to deliver superior customer service and, therefore, credited their achievements to IT-enabled product and business strategies (Karimi et al., 2001, p. 126). These transformations have resulted in superior business performance. Information technology tools such as handheld and laptop computers can help the sales department to collect detailed customer, and market data in real time; enterprise resource planning systems can automate the entire customer order fulfillment processes to increase responsiveness of the firm to market demands; Internet and web technology solutions can provide quick online access to new products and services. Many firms have created their electronic markets (Bakos, 1998, p. 37) using the Internet to “publish information about their products, services, pricing, and availability directly on the Internet” (Karimi et al., 2001, p. 126). The IT department teams up with the non-IT departments of the firm to implement these technology solutions. During implementation, the IT department’s management practices include the elements of the antecedent variables namely accountability, innovativeness, customer connectedness, and collaboration with other departments. If the IT management practices include superior performance in these four areas, the result is superior business performance. For example, the IT department’s superior accountability leads to positive relationships with the other departments within the firm. This intradepartmental positive relationship results in better collaboration and participation by all the involved parties resulting in a successful implementation of the IT solutions which leads to better firm performance. Combined together, the result is superior financial performance, superior customer service, higher customer retention, and better new product performance. Contrary results are also feasible. For instance, the IT department charged with implementing a customer relationship management solution may not collaborate with the other departments, show poor accountability, which results in dissatisfaction and hostility by the other departments, failed implementation which in turn leads to poor customer service, lost customers, and loss of revenue. In such a situation, the IT department's influence and power within the firm will be relatively low. Based on the preceding discussion, it is reasonable to theorize that the IT department's influence and power within the firm has a positive effect on the firm's business performance.

Consequences for Firm's IT Orientation

IT orientation as described in this study is a firm-level capability to use information communication technologies. The non-IT departments are IT savvy and have a high level of awareness about current information technologies and future trends. They seek new IT tools and solutions proactively to meet business needs. One example is the sales department's disposition towards using a broad range of information technologies including customer relationship management applications and sales force automation tools (Hunter & Perreault, 2006, p. 97). Here, IT orientation of the firm indicates the sales persons' propensity and analytical skills to use a portfolio of information technologies (Hunter & Perreault, 2006, p. 97) implemented by the IT department. During the implementation of the IT tools, the IT department would work in a collaborative and consultative manner with the sales department. This collaboration enhances the pervasiveness of the IT department and constructive accountability of the IT department. The sales department feels more confident about using technology and develops a sense of trust and credibility towards the IT department. The IT department's support for "sales automation plays an important role in ensuring" that the sales department "realizes performance returns from its investments in IT tools" (Hunter & Perreault, 2006, p. 97). Such support may include implementing new systems, developing custom systems, training users, and resolving user problems. In a study of brokers and sales assistants using workstations, Lucas and Spitler (1999) found that social norms including collaboration with others and colleagues attitudes had a greater influence on the use of technology, not the tenets of technology acceptance model based on ease of use and usefulness criteria. This supports the notion of IT department's influence and power through consultative interactions with the sales department creates a greater propensity for the sales department to use information technologies and become more IT oriented. There is an extensive literature (e.g., Cooper & Zmud, 1990; Fichman, 1992; Boynton, Zmud, & Jacobs, 1994) showing power and politics and IT department's relationship with other departments play an important role in fostering IT orientation and adoption of information technologies within the firm.

Although the IT department's influence and power can affect the IT orientation of the firm, in some firms the converse is also possible. The IT orientation of the firm may positively affect the IT department's influence and power. In a study of 147 firms over four years, Weill and Aral (2005) found that firms with more company-wide IT orientation were characterized by high use of electronic communication channels such as email, intranets, and wireless devices, high degree of digitization of sales, customer interaction, and purchasing transactions, more Internet use for processes such as employee performance measurement, sales force management, and training, high capability of all employees to use IT effectively, strong partnerships between IT department and other departments to generate value from IT investments. These characteristics lead to higher levels of interaction between the IT department and other departments thereby increasing the pervasiveness of the IT department thereby increasing its relative influence and power levels. Based on the preceding discussion, it is reasonable to theorize that the IT department's influence and power has a positive effect on the firms IT orientation (IT savvy).

Relationship Between Firm's IT Orientation and Business Performance

Weill and Aral (2005) argued that firms with high levels of firm-wide IT orientation derived greater value from their investments in information technologies (p. 6). In a study, Weill and Aral found that these firms had developed a culture of IT orientation (IT savvy) that affected every employee and every process: "The instinct and discipline to use IT effectively [was] part of every manager's thinking and part of DNA of the firm" (Weill & Aral, 2005, p. 6). In another 2007 survey of 152 CEOs and top management executives of mid size companies it was found that the more IT-savvy the business executives were, the faster they were able to expand (Bartholomew, 2007). Based on these findings, it is reasonable to theorize that firm's IT orientation has a positive effect on business performance.

The preceding sections focused on establishing a theoretical foundation to study the IT influence and power phenomenon in organizations. In order to study this phenomenon, several research methods were at this researcher's disposal. Which research method was chosen for this study, and why, is addressed in the following sections.

Methods in Information Technology Research

Academic disciplines and research communities employ diverse research methodologies, paradigms, and approaches (Orlikowski & Baroudi, 1991; Benbasat & Weber, 1996; Chen & Hirschheim, 2004). Researchers have written about different research methodologies, their advantages and disadvantages, as well as the researcher's own experience and predilection. However, many of the articles on research methods in information systems research are on conceptual analysis. For instance, Lee (1989) examined issues relating to case study as a scientific method of inquiry and argued that the value of research is debatable if the proclivity for scientific rigor takes away the focus of the research on its relevance to professional practice. Pinsonneault & Kraemer (1993) explored the use of survey method in IT research, found five weaknesses in the way researchers used survey method, and offered specific recommendations to address the problems. Walsham (1995) reviewed characteristics of the interpretive case study method, and presented a framework for conducting and reporting such work in the IT field. According to Walsham (1995), "if carried out and written up carefully, interpretive case study can make a valuable contribution to IS theory and practice" (p. 80). Klein and Myers (1999) argued in favor of interpretive research as a method of choice for developing and producing deep insights into the IT management and IT systems development phenomena. Alavi and Carlson (1992) examined articles published in eight major IS journals during 1968-1988 and classified the articles based on empirical and non-empirical studies, field studies, laboratory experiments, case studies and field experimentation. They found laboratory experiments to be popular during this period indicating that perhaps researchers were making an effort to test theories and construct empirically based theories. Palvia, Mao, Salam, and Soliman (2003) examined seven leading MIS journals published during 1993 and 1997 and found that survey methodology consistently ranked near the top. During this five-year period, the IS research community also employed other research methods including frameworks and conceptual models, laboratory experiments, and case studies (Palvia et al., 2003). Chen and Hirschheim (2004) examined 1893 research articles in the eight major American or European journals published between 1991 and 2001. They and found that, at a methodological level, 71% of the IT research articles published in the United States used quantitative methods, while 49% of the research articles published in the European journals applied qualitative methods. At the paradigmatic level, the 89% of the U.S. publications were characterized by a positivist paradigm. Although European journals also mainly published research based on positivist principles (66%), they leaned more towards interpretive research (34%) than U.S. journals.

Based on the preceding literature review and discussion, it is evident that quantitative paradigm is dominant in IT research. Balnaves and Caputi (2001) suggested survey research, case study research, and experimental research as the three most common forms of quantitative research methods (p. 66). Some scholars consider the case study research as a qualitative approach (Silverman, 2005; Creswell, 2007), while others categorize it as quantitative (de Vaus, 2001; Balnaves & Caputi, 2001). Yin (1993) stressing the irrelevance of categorizing case studies as qualitative or quantitative, points out:

> In fact, a point of confusion…has been the unfortunate linking between the case study method and certain types of data collection – for example, those focusing on qualitative methods, ethnography, or participant-observation. People have thought that the case study method required them to embrace these data collection methods…On the contrary, the method does not imply any particular form of data collection – which can be qualitative or quantitative. (Yin, 1993, p. 32)

Balnaves and Caputi (2001) suggested that case study, survey, and experiment are a form of data collection for quantitative research (p. 66). Survey research, experimental research, and case study research use a variety of data collection techniques, questionnaires being the most common way of collecting data, researchers may also use other data collection techniques including interviews, content analysis and observation (de Vaus, 2001). Questionnaires given to respondents consist of questions which are the operationalizations of concepts the researcher is interested in studying (Ruane, 2005). The concepts are measured via the questions or statements the researcher poses to the respondents (Ruane, 2005, p. 126). Questionnaires can be delivered to respondents in person, via email, or launched online via the internet, or administered by telephone (Ruane, 2005). Interviews are the more personal forms of survey research generally designed as personal meetings between an interviewer and respondent(s), and often criticized for the interviewer and respondent bias. The word ‘analysis’ after the word ‘content’ gives the impression that content analysis is an analysis technique rather than a data collection technique. Nevertheless, through content analysis, researcher gains new insights which are the data for the investigation (Gray, 2004). Data sources can include published and unpublished documents; company reports; memos; letters; reports; email messages; faxes; newspaper articles; web pages, documents, websites, archival records, etc. The researcher dissects the content in these sources into their constituent parts (concepts), generates new ideas and descriptions by making new connections between the concepts to support the research (Gray, 2004, p. 327). Although this method offers the flexibility to review content repeatedly, often unobtrusively, and broad coverage of data over an extended period, it suffers from “difficulties involved in retrieving data and inherent researcher bias in source selection and reporting" (Frankel, Naslund, & Bolumole, 2005, p. 197). Observation involves recording the behavioral patterns of people, objects, and events in a systematic manner to obtain information about the phenomenon of interest (Malhotra 2004).

The preceding discussion compared the data collection methods that quantitative researchers may employ in their research. Typically researchers select the data collection method that best fits the research they are engaged in, the methodological choices such as a case study versus experimental or survey, including such factors as time and financial resources available to complete the data collection process. In the next section, characteristics of the three quantitative research methods are compared.

Choosing a Research Method for the Current Study

The preceding section concluded that the IT researchers generally have a positivist orientation with recent trends showing an inclination towards the interpretive paradigm. Literature review showed that survey research, experimental research and case study method are the dominant methods used by IT researchers. In this section, a rationale for survey research as the method of choice for the current study is presented.

According to Pinsonneault and Kraemer (1993) survey is a means to gather information about a population, whereas the purpose of survey research is to advance scientific knowledge. Political polls, opinion surveys, marketing surveys are some of the most commonly used surveys for collecting data on characteristics, actions, or opinions of large groups of people. On the other hand, survey research has three distinct characteristics: first, it is a quantitative method producing quantitative reports about some facet of the population studied; second, information is collected by asking people structured and predefined questions and responses to the questions make up the data to be analyzed; third, information is generally collected about a fraction of the population (Pinsonneault & Kraemer, 1993; Fowler, 2009). Conducing survey research entails "identifying a specific group or category of people and collecting information from some of them in order to gain insight into what the entire group does or thinks" (de Leeuw, Hox, & Dillman, 2008, p. 3). The data is collected in such a way that the researcher can generalize the research findings to the study population (Pinsonneault & Kraemer, 1993). Therefore, what separates survey research from common surveys is the ability to generalize the findings. Survey research is conducted on population such as manufacturing organizations, service organizations, work groups, IT departments, or various users of IT systems such as managers, professional workers, and clerical workers. Data is collected from a large enough sample of these populations so that extensive statistical analysis can be performed and the results can be generalized to the study population.

Survey research is most appropriate when the central questions of interest about the phenomena are who, what, where, how many and how much (Pinsonneault & Kraemer, 1993; Gray, 2004). Although experimental method and case study are more often used for answering the how and why questions (Gray, 2004), survey method is also used to a greater extent than is commonly understood (Pinsonneault & Kraemer, 1993). Survey research method is effective when it is not possible or desirable to control the variables, and the phenomenon must be studied in its natural setting either in the recent past or in the present time (Pinsonneault & Kraemer, 1993). On the contrary, survey method is less effective compared to case study and other qualitative methods for developing a detailed understanding of context and history of the phenomenon (Pinsonneault & Kraemer, 1993).

Case study method is the most common qualitative research method used in information technology research (Orlikowski & Baroudi, 1991). Some researchers have argued that case study research is particularly well suited for investigating the implementation aspects of IT which includes the study of the interplay between IT and the organizational setting rather than the technical issues (Montealegre, 1999). The primary focus of case study research is to develop a deep understanding of a phenomenon and its context (Cavaye, 1996). Case study research is appropriate when researchers have to depend on multiple sources of evidence (Yin, 1993) in order to bring out the details of the research from multiple perspectives including the perspective of the participants (Frankel et al., 2005).

Although the preceding discussion elicits many advantages of case study method, some researchers also note several practical difficulties associated with undertaking case studies. It is difficult to design a case study research which adequately answers the research questions; data collection for a case study can be tiresome and take a long time and results in accumulation of large amounts of data (Yin, 1994; Cavaye, 1996). It is not easy to get companies to agree to cooperate in a case study research thereby limiting the availability of suitable case studies to study specific phenomenon. Writing a case study research report can be arduous: capturing and documenting the process used to arrive at the results, and to establish the validity of the findings and conclusions reached through meticulous narratives, are all exacting tasks (Darke, Shanks, & Broadbent, 1998). This researcher also faced these difficulties. Consequently, case study was not a method of choice for this study.

Quantitative methods require detachment of the observer. However, personal involvement is appropriate in a variety of research designs. Case study, survey research, and experiments are the three major quantitative research methods. All the three methods can employ different data collection techniques some requiring the involvement and others not requiring the involvement of the researcher. This researcher's interest is in the area of information technology management. Which of the three quantitative methods is dominant in IT research? The next section explores the answer to this question.

Trends in Information Technology Research Methods

In a detailed analysis of 843 articles published in seven journals Palvia, Mao, Salam, and Soliman (2003) found survey research method in extensive use by IT researchers and suggested that it is suitable for descriptive studies characteristic of the 1970s and 1980s (Kowshik, 2009). Notwithstanding its ability to achieve high levels of external validity, survey research method suffers from lack of control and internal validity (Palvia et al., 2003, p. 292). Among the journals studied by Palvia, Mao, Salam, and Soliman, (2003), and during the period studied, the survey research method was the most widely used research methodology (24%). The second most commonly used methodology was frameworks and conceptual models (15%). Palvia, Mao, Salam, and Soliman, (2003) observed that the relative newness of IT research area compared to other disciplines and rapid new developments in IT during 1993-1997 may have contributed to "the enthusiastic quest for new research models and frameworks" (p. 296). Similarly, due to the novelty of many IT phenomena, researchers also used laboratory experiments (12.5%) making it third among the most commonly used research methodologies. Case study (10.4%) took fourth place; apparently the call for case studies made in the late eighties and early nineties seem to have had an effect. Mathematical modeling, speculation/commentary, literature analysis, and field study shared similar percentages at 7.3%, 6.6%, 6.3%, and 5.6 % respectively. These methodologies were less predominant in general. Interview, library research, secondary data, and field experiment were at 3.7%, 2.9%, 2.7%, and 2.2% respectively. More interestingly, the results showed fewer articles utilizing qualitative research. Out of the 1031 total methodology count, only eight (0.8%) used qualitative research.

From a trend perspective, analyzing data year-by-year during 1993-1997, Palvia et al., (2003) found survey research remained the strongest research methodology throughout the 5-year period. It was ranked 2nd in 1993 and then first from 1994 through 1997. Although it was not the top one in 1993, it had a high percentage of use nevertheless (19.0%). While the case study method gained popularity over the years, framework/conceptual model based research declined continually. Starting with sixth and fifth rankings in 1993 and 1994, case study methodology moved to second place in 1996 and third place in 1997. On the other hand, framework/conceptual model was the highest used in 1993, but dropped to second place in 1994, fourth in 1995, third in 1996, and finally sixth place in 1997. Palvia, Mao, Salam, and Soliman, (2003) attributed this trend to a change in preference of the journals from publishing frameworks that guide research to publishing actual research. Speculation/commentary ranked second in 1997. Palvia, Mao, Salam, and Soliman, (2003) attributed these trends to rapid changes in the information technology arena and a lack of theoretical groundwork to guide research in these new areas. Laboratory experiments remained in the top three ranks except in 1996, when it dropped just slightly below to fourth place. When manipulation of the independent variables was desired, IS researchers favored the laboratory experiment methodology because of the control it affords. Library research, which was based primarily on literature review alone, became less predominant over the years. This trend showed that IT research was moving towards maturity and that more sophisticated methodologies were being used increasingly. Palvia, Mao, Salam, and Soliman, (2003) found that researchers were using speculation and case study more often in the later years during 1993-1997. Palvia, Mao, Salam, and Soliman, (2003) argued that these trends were an indication of the emergence of newer technologies and the lack of attendant theories to study them. In general, Palvia, Mao, Salam, and Soliman, (2003) found that library research, literature analysis, field experiments, laboratory experiments, and mathematical modeling were less frequently used during 1993-1997. The trends of the high use of the survey method and lesser use of the field study method were generally stable over the years. Qualitative research was rarely used throughout the 1993-1997 years.

In a more recent study, Avison, Dwivedi, Fitzgerald, and Powell (2008) examined the general research paradigms used in the information systems journal (ISJ) over a 17 year period from 1991 to 2008. They found that approximately 30% of the research articles published fell in the positivist paradigm category while 70% fell in the interpretive paradigm category. However, the positivist tradition showed an increasing trend from 23% during 1991-1996 to 32% during 1997-2002 and remained constant thereafter. On the other hand, the interpretive tradition showed a decline from 77% during 1991-1996 to 68% during 1997-2002 and remained constant thereafter. Nevertheless, ISJ has published predominantly interpretive research. Upon a further classification of these research papers based on the research methods used, quantitative, qualitative, and mixed method research, Avison, Dwivedi, Fitzgerald, and Powell (2008) found 18% of the researchers used quantitative methods, 36% used qualitative methods, and only 6% used mixed methods. However, the use of quantitative methods increased from 17% during 1997-2002 to 20% during 2003-2007, whereas the use of qualitative methods declined from 44% to 43%, and mixed research methods declined from 10% to 6% during the same period (Avison et al., 2008, Table 7, p. 14). Avison, Dwivedi, Fitzgerald, and Powell (2008) classified the research designs evident in these papers into survey research, case study, laboratory experiment, field experiment, action research, ethnography, grounded theory and 'others'. They found that researchers predominantly used survey research and case study methods over the 17 year period from 1991-2007. Also, both these methods significantly increased: 8% of the papers used survey methods and 10% used a case study during 1991-1996 increasing to 17% using surveys and 30% using a case study during the 2003-2007 period (Avison et al., 2008, Table 9, p. 15). Ayanso, Lertwachara, and Vachon (2007) examined 549 articles published in major IS journals between January 2000 and December 2006 and found that about 27% of the researchers used survey method which accounted for the most used research method, whereas the combined total for case study, action research, ethnography, and grounded theory accounted for 12% of the papers published.

Sidorova, Evangelopoulos, Valacich, and Ramakrishnan (2008) examined trends in IS research in five different areas: IT and organizations; IT and individuals; IT and groups; IS development; and IT and markets. They found that research in the areas of IT and organizations and IT and individuals was relatively constant over a span of 20 years from 1987 to 2006. However, research themes within these two areas changed over time ranging from IT planning, IT for competitive advantage, and the role of top management during 1987-1991 to supply chain management, industry-specific issues, and IT for competitive advantage during 2002-2006. On the contrary, research in the area of IT development was less popular among IT researchers from 1987–1991 to 2002–2006. In the late 1980s and early 1990s, researchers in the IT development area focused on specific types of information technologies, such as decision support systems, expert systems, databases, and so on. In the late 1990s to mid 2000s, the focus shifted to managerial practices in IS development, such as business process reengineering, training, and risk management. These trends suggested that the IS discipline became less technology focused and more business-process focused over time shifting its "identity from a narrow preoccupation on computer programming and application development methodologies to an identity that encompasses the social context of IS development and use" (Robey, 2003, p. 353). This shift in identity was a sign of changes in business trends, such as increased use of packaged IT solutions, making the technical aspects of IS development less relevant to the broader IS community (Sidorova et al., 2008, p. 476).

The preceding literature review presented publication patterns and trends in leading journals. This is a snapshot of the state of research in the IT field. Besides knowing the current state of research methodologies in use, this review brought awareness to this researcher regarding differing methodologies employed and subject domains explored by the IT researchers and journal publications. At a macro level, this information was helpful to this researcher in the choice of appropriate methodologies to use for this dissertation research.

Survey Research Methodology

Although the IT research community has used a wide variety of research methods over the last 20 years, it has shown a greater inclination to use survey research and case study research methods. Some researchers have argued that case study method takes a long time and the use of relatively less time consuming survey research method is motivated by the "publish or perish" pressure in the academic research community (Chen & Hirschheim, 2004). Other researchers have argued that the greater use of survey research method was driven by an interest in maximizing the "generalization of results at the cost of lower realism of context and precision of measurement" (Palvia et al., 2003, p. 304). IT researchers place a greater emphasis on the external conclusion validity rather than depth and context of a proposed theory (Palvia et al., 2003). This emphasis on external validity could be attributed to the origins of the IT discipline (Kowshik, 2009). Information technology has its origins in many reference disciplines and uses theories developed in those reference disciplines to extend knowledge related to its own issues (Vessey, Ramesh, & Glass, 2002). These reference disciplines bring topics, problems, and issues crucial to the parent discipline, which may also be addressed in the IT context (Vessey et al., 2002). Consequently, IT researchers have a penchant to ensure that their research has external validity which in turn brings a greater level of acceptance in multiple disciplines and in society in a broad sense. This broader acceptance by multiple disciplines is important to IT researchers because IT affects society, and IT is affected by society.

This is a study of the IT department in the context of organizations. The literature review identified that IT management and organizational issues relied predominantly on survey research and case study research methods. For reasons elicited in the preceding discussion, this study used survey research method to investigate the IT department's influence and power within firms. To develop a better understanding of this research method, leading IS publications were explored for articles published during the past six years which used survey research method. Through the Walden University Library website, the EBSCO database was searched for articles published between 2003 and 2009 in major peer-reviewed journals. Table 2 lists the articles and summarizes the key informants in these research efforts.

Table 2

Contemporary Research in IT using Survey

Researchers	Respondents
Bassellier, Benbasat, & Reich, 2003	Survey, 404 business managers from two large insurance companies
Bhatt & Grover, 2005	Survey, 202 CIO, VP of IT, and director of IT from manufacturing firms
Bradley, Pridmore, & Byrd, 2006	Survey, 225 CIOs and top IT executives of firms that had 50 or more IT staff members
Enns, Huff, & Higgins, 2003	Survey, 139 CIOs and executives (69 CIOs and 69 peer executives of CIO for matched pair questionnaires) from various firms
Johnson & Lederer, 2005	Survey, 202 CEOs and CIOs of diverse industry firms
Kahai, Carr, & Snyder, 2003	Survey, 108 top IS executives of Fortune 1000 firms
Karimi, Somers, & Bhattacherjee, 2007	Survey, 148 CIOs, VP of IT of manufacturing firms
Kearns & Sabherwal, 2006	Survey, 269 CIOs of medium-to-large companies in the U.S.
Liang, Saraf, Hu, & Xue, 2007	Survey, 100 managers of Chinese manufacturing companies
Mitchell, 2006	Survey, 114 CIOs of Health Networks
Neufeld, Dong, & Higgins, 2007	Survey, 209 CIO, VP of IT, Director, VP of manufacturing companies
Oh & Pinsonneault, 2007	Survey, 110 CIOs and CEOs of small and medium sized manufacturing firms
Ramiller & Swanson, 2003	Survey, 143 CIOs and senior executives of diverse industry firms
Sabherwal & Chan, 2001	Survey, 164 CEO, CIO, CFO, and VP of diverse industry firms
Tanriverdi, 2006	Survey, 356 senior IT executives of Fortune 1000 manufacturing and service firms

Note. Adapted from Kowshik (2009).

The 15 research articles, listed in Table 2, employed self-administered mail-out survey questionnaire for collecting data. This appeared to be the norm for conducting survey-based research in the IT domain. Straub (1989) recommended using “previously validated instruments wherever possible,” but making sure to revalidate the instrument content, constructs, and reliability if it is significantly altered (p. 161).

The researchers developed their own questionnaires using items and scales which have already been validated in previous empirical and theoretical literature. Majority of the research articles gave a clear description of the profile of the sampling frame and the respondents. The researchers reported using university experts and mailed preliminary questionnaires and interviews of a few selected executives for content validation during the instrument development and pretest phase.

All of the researchers listed in Table 2 appended whole or part of the previously used questionnaires and performed pretest/pilot test of the instrument. All of the researchers reported response rate, validity or reliability analysis of items. The authors indicated that the average response rate was generally low in the IS domain. Many of the researchers attributed this high-response error to the managerial level of the respondents in the organization. Most of the respondents were senior executives such as CEO, CIO, CFO, and vice presidents, and the researchers surveyed multiple senior executives for their study. The authors cited previous research to support their low response rate as an expected outcome from surveys involving senior executives and multiple respondents. Failure to perform statistical tests to assess the effects of nonresponse error was consistent with the findings of Ju, Yueh-Yang, Szu-Yuan, and Chang-Yao (2007).

The 15 research articles reported validating their research instruments. They described their reliability and content and construct validities. Majority of the studies assessed the reliability of their instruments through the standard coefficient of internal consistency, i.e., Cronbach's alpha. They used various methods for construct validity and discriminant validity measures.

The research articles in Table 2 also included a separate instrument validation section indicating that it is important to their research. This was consistent with the recommendations for quality research reports (Straub, 1989; Boudreau, Gefen, & Straub, 2001; Straub, Boudreau, & Gefan, 2004). Researchers of the 10 articles reported testing for nonresponse bias, some of them also tested for common method bias. For nonresponse bias testing, the use of late response as a proxy for nonresponse seems to be the standard. Also, for testing common method bias, Harmon's one factor test appears to be the standard. Table 3 summarizes these observations.

Table 3.

Contemporary Survey Research Characteristics

Researchers	Sampling Frame	Response Rate	Reliability Measure	Validity Measures	Method Bias Measures
Bassellier, Benbasat, & Reich, 2003	Two insurance companies, Employee List	42.4%	Cronbach's Alpha	Not reported	Not reported
Bhatt & Grover, 2005	Manufacturing firms	17%	Comparative Fit Index, Root Mean Square Residual	Composite Reliability for convergent validity; Pair-wise Test & Chi-Square test for discriminant validity.	Exploratory factor analysis and Correlational analysis
Bradley, Pridmore, & Byrd, 2006	Directory of Top Computer Executives	22.5%	Cronbach's Alpha	Factor analysis and Average Variance Extracted for convergent validity; Pair-wise Test for discriminant validity.	ANOVA for non-response bias
Enns, Huff, & Higgins, 2003	Directory of 3000 manufacturing firms supplied by a marketing vendor	15%	Item level reliability	Factor analysis for convergent validity; Variance shared between construct and measure for discriminant validity	Not reported

(table continues)

Researchers	Sampling Frame	Response Rate	Reliability Measure	Validity Measures	Method Bias Measures
Johnson & Lederer, 2005	Chamber of Commerce List, Database of Major Employers in the sampling area, American Business Index	20%	Cronbach's Alpha	Confirmatory Factor Analysis	Multivariate ANOVA
Kahai, Carr, & Snyder, 2003	Directory of Top Computer Executives	23%	Not reported	Not reported	Not reported
Karimi, Somers, & Bhattacherjee, 2007	Harris Nationwide Manufacturing Database	27%	Composite Reliability measure	Average Variance Extracted	Exploratory Factor Analysis and Correlational analysis
Kearns & Sabherwal, 2006	Mailing list of 9,000 medium – to-large firms derived from multiple sources	25%	Cronbach's Alpha & Composite Reliability	Average Variance Extracted, Pair-wise correlation, Chi-square difference test	Harmon's One-factor test
Liang, Saraf, Hu, & Xue, 2007	UFIDA Database of Chinese Client firms	77%	Composite Reliability measure	Average Variance Extracted	Harmon's One-factor test; and common method factor included in Partial Least Squares analysis

(table continues)

Researchers	Sampling Frame	Response Rate	Reliability Measure	Validity Measures	Method Bias Measures
Mitchell, 2006	114 Health Networks that used HL7 compliant interface engines for integration	Not Reported	Cronbach's Alpha	Principal Components Analysis with varimax rotation	Harmon's one factor test
Neufeld, Dong, & Higgins, 2007	Globe and Mail Database of Canada Top 1000 firms & SCOTT database of Canadian Companies	49.5%	Composite Reliability	Average Variance Extracted	Non-response bias using Chi-square test
Oh & Pinsonneault, 2007	Comprehensive list of all 787 manufacturing firms in a large Canadian Province	32%	Cronbach's Alpha	Not reported	Not reported
Ramiller & Swanson, 2003	CIO mailing list developed by the researchers based on known contacts	10.4%	Cronbach's Alpha	Not reported	No measures reported
Sabherwal & Chan, 2001	Dun and Bradstreet Directories	19%	Cronbach's Alpha	Not reported	No measures reported
Tanriverdi, 2006	Databases of CIO magazine and Darwin magazine	40%	Cronbach's Alpha	Factor Analysis	No measures reported

Note. Adapted from Kowshik (2009).

The research papers listed in Table 3 used a variety of statistical tests and methods. From a survey research perspective, it was evident from the review that researchers in the IT domain used specific techniques that were common. Table 4 summarizes the statistical techniques used in these research papers.

Table 4.

Statistical Methods Used in Contemporary IT Research

Researchers	Statistical Tests for Reliability, Validity, and Fit	Statistical Method for Hypotheses Testing	Software Tools Used
Bassellier, Benbasat, & Reich, 2003	Cronbach's Alpha, Composite Measure Reliability, Goodness of Fit Index, Normed Fit Index, Comparative Fit Index, Chi-Square test, RMSEA, Descriptive Statistics	Structural Equation Modeling – Maximum Likelihood Estimation, Covariance Matrix	LISREL version 8.5
Bhatt & Grover, 2005	Cronbach's Alpha, Composite Measure Reliability, Goodness of Fit Index, Normed Fit Index, Comparative Fit Index, Chi-Square test, Descriptive Statistics	Structural Equation Modeling – Confirmatory Factor Analysis	LISREL version 8.5
Bradley, Pridmore, & Byrd, 2006	Cronbach's Alpha, Average Variance Extracted, Descriptive Statistics	K-means Cluster Analysis, ANOVA, Structural Equation Modeling - Partial Least Squares	PLS-Graph
Enns, Huff, & Higgins, 2003	Cronbach's Alpha, Descriptive Statistics	Structural Equation Modeling - Partial Least Squares	PLS-Graph
Johnson & Lederer, 2005	Correlation Analysis, Composite Measure Reliability, Paired t-test, Principal Components Analysis, Descriptive Statistics	Structural Equation Modeling – Confirmatory Factor Analysis	EQS version 5.2
Kahai, Carr, & Snyder, 2003	Descriptive Statistics	Correlation Analysis	

(table continues)

Researchers	Statistical Tests for Reliability, Validity, and Fit	Statistical Method for Hypotheses Testing	Software Tools Used
Karimi, Somers, & Bhattacherjee, 2007	Composite Measure Reliability, Average Variance Extracted, Descriptive Statistics	Structural Equation Modeling – Partial Least Squares	PLS-Graph version 3.0
Neufeld, Dong, & Higgins, 2007	Cronbach's Alpha, Average Variance Extracted, Composite Reliability, Chi-square test, Descriptive Statistics	Structural Equation Modeling – Partial Least Squares	PLS-Graph version 3.0
Oh & Pinsonneault, 2007	Cronbach's Alpha, Descriptive Statistics	Ordinary Least Squares, Linear and Quadratic Equations	MATLAB
Tanriverdi, 2006	Cronbach's Alpha, Composite Measure Reliability, Goodness of Fit Index, Normed Fit Index, Comparative Fit Index, Chi-Square test, RMSEA, Descriptive Statistics	Moderated Regression Analysis	
Kearns & Sabherwal, 2006			
Liang, Saraf, Hu, & Xue, 2007	Composite Measure Reliability, Average Variance Extracted, Descriptive Statistics	Structural Equation Modeling – Partial Least Squares	PLS-Graph version 3.0
Mitchell, 2006	Cronbach's Alpha, Average Variance Extracted, Composite Reliability, Chi-square test, Descriptive Statistics	Cox Regression (Proportional Hazard Regression)	
Neufeld, Dong, & Higgins, 2007	Cronbach's Alpha, Average Variance Extracted, Composite Reliability, Chi-square test, Descriptive Statistics	Structural Equation Modeling – Partial Least Squares	PLS-Graph version 3.0
Oh & Pinsonneault, 2007	Cronbach's Alpha, Descriptive Statistics	Ordinary Least Squares, Linear and Quadratic Equations	MATLAB
Ramiller & Swanson, 2003	Cronbach's Alpha	Factor Analysis using Principal Components Approach	
Sabherwal & Chan, 2001	Cronbach's Alpha, Descriptive Statistics	Pearson's Product-Moment Correlation Coefficient	
Tanriverdi, 2006	Cronbach's Alpha, Composite Measure Reliability, Goodness of Fit Index, Normed Fit Index, Comparative Fit Index, Chi-Square test, RMSEA, Descriptive Statistics	Moderated Regression Analysis	

Note. Adapted from Kowshik (2009).

Boudreau, Gefen, and Straub (2001) found that a majority of the studies assessing reliability of their instruments did so through the standard coefficient of internal consistency, i.e., Cronbach's alpha (79%). Most of the 15 research reports reviewed here used Cronbach's alpha. Nine out of the 15 research articles reviewed made use of "second generation statistical techniques" (Boudreau et al., 2001, p. 6) that is Structural Equation Modeling (SEM) tools such as LISREL, PLS, and EQS. These techniques offer advantages through the "analysis of interrelated research questions by modeling the relationships among multiple independent and dependent constructs simultaneously, in a single, systematic, and comprehensive analysis" (Boudreau et al., 2001, p. 6). According to Boudreau, Gefen, and Straub (2001) instrument validation is easier to do with SEM and, therefore, more prevalent in IS research that adopts second-generation tools. This is consistent with the 10 research articles reviewed in this section.

Discussion and Conclusions

The literature review in this chapter highlighted the contributions of studies in intraorganizational power, IT department's role, the role of IT users, and various other information systems related studies to the understanding of how influence and power of a department in general, including the IT department in particular, at the intraorganizational level, affects the organization's environment. However, the findings of these studies have limited relevance to practice. The possibility of using these findings to develop strategies for improving the IT department's effectiveness is constrained by the underlying methodological inadequacies. Firstly, previous studies used methodologies focusing primarily on the directly-observable influence variables, and measuring the effects of these variables on the IT department's influence and power. The methodologies did not consider the possibility of variables representing several influence factors interacting with one another. Consequently, these studies were not holistic, and the results were limited in their ability to explain the combined effect of multiple influence factors on the IT department's influence and power levels. Secondly, previous studies largely converted qualitative data into quantitative data and then performed multiple regression analysis. It is typical to conduct surveys and obtain numerical scale responses to human perceptions and subjective judgment in order to convert qualitative data into quantitative data. The problem, however, is that, when used for measuring a variable, this method suffers from intrinsic measurement errors and regression analysis does not account for errors in the measurement. Structural equation modeling (SEM) was used in this study to overcome these limitations. SEM techniques are ideally suited to address these methodological limitations. Another important aspect to consider as an impetus for the current study and justification for its relevance is that the prior studies, specifically studies addressing the IT department's influence and power, were conducted over two decades ago. From that time to the present, information and communication technologies have evolved extensively, Internet and wireless technologies have radically enhanced the pervasiveness of IT. A more contemporary perspective is missing regarding the phenomenon of IT department's influence and power within the firm. The current research is highly relevant, and the study findings shed new light on the IT department's characteristics, bring a more enlightened point of view regarding the balance of power in organizations, and spark fresh interest amongst researchers to study this phenomenon in new ways.

From the perspective of research methodology, survey research, which was the method of choice for this study, is a cooperative effort amongst the researcher, the respondents, other researchers and scholars, groups, research communities, and organizations (Kowshik, 2009). The survey questionnaire acts as the glue that holds this cooperative effort. Pretesting of the instrument helps the researcher to do a reality check on how well the "researcher's own conceptualization of the problem matches the experience of the practitioner" (Malhotra & Grover, 1998, p. 408). Using a tested questionnaire instrument to produce confirmatory follow up research in an iterative process helps to continuously improve and validate the instrument and the research.

After establishing a theoretical foundation and identifying the research gaps, a rationale for choosing the survey as the research method was presented in this chapter. In chapter 3, the research method and design employed for this study are discussed in detail.

Chapter 3: Research Method

Introduction

This chapter provides an overview of the research method and design. The methodological approach is explained relative to data collection and analyses. It includes the concept of structural equation modeling (SEM), whose techniques are justified—as opposed to other statistical techniques—for the analyses. The objective of this study was to increase the understanding of the relationship between the IT department's influence and power within a firm and the antecedent variables namely accountability, innovativeness, customer connectedness, and partnering with other departments. This study also tested the effect of IT department's influence and power upon a firm's IT savvy and business performance. An empirical demonstration of the predictive relationships between the antecedent variables, the IT department's influence and power, the IT savvy of the firm and business performance would enable the IT management practitioners to align their IT departments with the rest of the organization. This IT-business alignment could help increase the IT department's influence and power within the firm. An influential IT department could positively affect the firm's business performance.

Research Approach

Methodology deals with how we gain knowledge about the world. Defined as "a body of methods, rules, and postulates employed by a discipline: a particular procedure or set of procedures" (Merriam-Webster Online, 2009), the research methodology is the foundation for selecting methods used to gather data, and to establish the classification and samples of data to be gathered (Frankel, Naslund, & Bolumole, 2005).

Researchers carry personal beliefs and attitudes based on experience in organizations, and knowledge and perceptions about the attitudes of other people towards organizational social phenomena. This researcher was not an exception. Therefore, as a participant involved in organizational processes, to avoid the effects of personal bias, this researcher took the positivist, detached approach to conduct this research.

Quantitative approach using correlational research design was used in this study so that an objective justification could be given for the causes of changes in the organizational phenomenon of intraorganizational power. This approach also helped in minimizing errors and bias. The research model was operationalized using theoretical constructs in a latent variable model. The following sections describe the motivation and justification for using this approach.

Quantitative Approach

The quantitative approach to the study of IT departments within firms, how IT departments are affected by situational factors within organizations, and how IT departments affect organizations, can be understood as a manifestation of epistemological and ontological assumptions: that there is an observable reality "out there" composed of clear causal relationships patterned and predictable, between the corporate IT department and the firm; that there are multiple dimensions of antecedents, including accountability, innovativeness, customer connectedness, and collaboration with other departments that affect the corporate IT department and its properties which, in turn, affect the organization, and can be identified as existing regardless of the research process.

The IT researcher and the IT department that is researched, or the subject and the object, are on different planes "conceptualized in a dichotomous model" (Hesse-Biber & Leavy, 2006, p. 14) within the research process. In this framework, data are derived from human subjects who are viewed as objects for research processes. As a quantitative researcher, this researcher administered survey questionnaire to the organizational leaders like the vice presidents, directors, CFOs, and CEOs who are the research subjects, to gather data, "who in the positivist world view [were] transformed into knowable objects of inquiry" (Hesse-Biber & Leavy, 2006, p. 14).

This study aimed to develop explanations using inferential statistical methods to enhance the understanding of the relationships among the situational factors in organizations particularly the IT department in the context of the organization. According to Sayer, inferential statistics is a form of inductive inference in which the characteristics of a population are estimated from sample data (1992, p. 191). In the current study, the explanation consists of the identification of factors that have a causal relationship with the organizational phenomena such as the IT department's influence and power within the firm, the IT orientation of the firm, and the firm's business performance such that the occurrence of these organizational phenomena depends on the presence of the factors. The social processes, which describe the IT department within the firm and the firm itself, are influenced by a wide range of factors that operate in various combinations in different ways under varied conditions. This research gives reasons for these variations and interactions of factors regardless of the level of influence on the organizational situations. Researchers use statistical hypothesis testing and probability to produce statistical explanations when a large number of causal factors are involved. As Sayer observes, “an obvious reason for adopting such methods is that social processes have an apparently ‘statistical’ character compared with the more ‘deterministic’ processes to which the natural (closed system) sciences have access” (1992, p. 191).

Theoretical Construct

Since this researcher followed the positivist tradition of the natural sciences and since scientific generalization is the fundamental principle of natural science research, the methodology of this research also followed the generalization principle evidenced by comparability of measurements (Blalock, 1989). Evaluating the generalizability of a researcher’s theoretical assertions requires the researcher’s judgments on whether the assertions can be tested, verified, and confirmed (Hughes, Price, & Marrs, 1986; Sayer, 1992). To meet these evaluation standards, a clear and explicit specification of theoretical construct definitions and operationalizations were developed in this study.

A theoretical construct is an intellectual device, and thus simply a concept, by means of which events are construed (Skrondal & Rabe-Hesketh, 2004). Relationships between constructs provide inductive summaries of observed relationships allowing the researcher to setup explanatory and predictive principles in the form of general laws or theories (Hughes, Price, & Marrs, 1986; Skrondal & Rabe-Hesketh, 2004). Any explanatory and predictive capability of the theoretical constructs depends on the conceptualization and measurement of the theoretical terms which are intertwined and determined by the construct validity of the theory (Cronbach, 1975). The theoretical constructs themselves are often not observable and, therefore, not measurable. Therefore, the construct is operationally defined in terms of a number of items or indirect indicators such as responses to questions in a survey instrument (Skrondal & Rabe-Hesketh, 2004). The relationship between the latent construct and the observed indicator is usually modeled in a latent variable model (Skrondal & Rabe-Hesketh, 2004):

$$y_{ij} = \lambda_i \eta_j + \varepsilon_{ij}, \tag{1}$$

where, η_j is the latent variable representing the theoretical construct, λ_i is the factor loading, and ε_{ij} is the measurement error.

Theoretical constructs are used extensively in psychological research. Skrondal and Rabe-Hesketh (2004) argued that “most research in psychology and similar disciplines is concerned with hypothetical constructs such as self-esteem, personality and life-satisfaction.” In education research, hypothetical constructs such as ‘reading ability’ or ‘arithmetic ability’ have been used. Depression is a hypothetical construct extensively used in medical research. In business research, 'market segment' is a hypothetical construct. In this study, this researcher took the same approach of latent variable modeling, and testing of the hypothetical constructs (Hughes, Price, & Marrs, 1986).

Latent Variable Models

Latent variables are observed or measured indirectly because direct observation and measurement is not possible. Latent variables are inferred constructs invented by the researcher, based on the selected observed variables which define the latent variables, to understand the research area of interest and for which there is no operational method for direct measurement (Everitt & Dunn, 2001; Schumacker & Lomax, 2004). A question that needs further clarification and justification for using latent variable models in this research is: Although the hypothetical constructs developed here cannot be directly measured, is this researcher's approach of inferring the cause-effect relationships of IT department's influence and power, based merely on the hypothetical constructs, scientific enough to advance organizational science? This researcher borrows Everitt and Dunn's (2001) argument, based on previous research, that "[Yes], science can advance using the concept of a latent variable" (p. 305). After all, gravity was initially a hypothetical construct which later became the foundation of physics. Everitt and Dunn (2001) cited previous research to argue that the justification for using hypothesized latent variables is "their theoretical utility rather than their reality" (p. 305). Everett and Dunn (2001) cite their personal communication with Fergusson and Horwood (1986) to offer an elegant summary supporting the use of latent variables and the approach used in this study:

> Scientific theories describe the properties of observed variables in terms of abstractions which summarize and make coherent the properties of observed variables. Latent variables, are, in fact, one of this class of abstract statements and the justification for the use of these variables lies not in an appeal to their 'reality' or otherwise but rather to the fact that these variables serve to synthesize and summarize the properties of observed variables. (Everitt & Dunn, 2001, p. 305)

In this study, the IT department's influence and power in a firm is a latent variable and represents a construct which cannot be observed directly through visual inspection of an individual or the department and thus there is no solitary definition of departmental influence and power that everybody agrees upon. As a consequence, to test the conceptual model this study employed a methodological approach consisting of finding variables, which could be observed, and using those observable variables "as proxies for the unobservable constructs" (Hughes, Price, & Marrs, 1986, p. 128). One possible method was to choose carefully one measurable variable for each theoretical construct which captured the important facets of the theoretical construct. It was unrealistic to expect, however, that such a single measurable variable could be found unequivocally (Hughes, Price, & Marrs, 1986; Kline, 2005). Therefore, the approach taken in this study was to select multiple observable indicators for each unobservable latent variable. There was, however, the problem of error contained in the measured variables, and when used in statistical models, such as regression, analysis of variance, covariance, and path analyses, the coefficients obtained would be biased, "most often in unknown degree and direction" (Hughes, Price, & Marrs, 1986, p. 129). In order to address these issues, latent variable modeling was performed in this study using SEM methods with AMOS version 17 software (Arbuckle, 2008) included within the SPSS statistics version 17 software package. Latent variable models directly link *a priori* theory to empirical observations thereby augmenting the integration of theory building and theory testing (Hughes, Price, & Marrs, 1986). Using latent variable models observed phenomena and theory could be tested together in a thorough and unambiguous manner (Hughes, Price, & Marrs, 1986).

Justification for Using SEM

Structural equation modeling offered several advantages over multiple regression analysis or path analysis. First, the software package AMOS used in this study allowed the error variance to be specified within the statistical analysis. In this study, eight latent variables were represented by a series of observed indicators. Cronbach's alpha measures indicated whether or not these observed indicators perfectly represented the latent variables, and the estimated error variance was incorporated into the estimates of the error terms in the structural model. Thus, in SEM, the "coefficients associated with the relations will differ from those found using path analysis, or regression analysis, where the estimated measurement error is not considered explicitly in the analysis of each independent variable" (Smith & Langfield-Smith, 2004, p. 55). Second, SEM provides a range of fit indices to assess the overall fit of the entire structural model. Third, the more flexible assumptions, specifically allowing interpretation even when multicollinearity is present, use of confirmatory factor analysis and multiple indicators per latent variable to reduce measurement error. Fourth, AMOS software package used in this study helped better model visualization through its graphical modeling interface. Finally, the most important reason for using SEM was the desirability of testing models overall rather than coefficients individually.

The SEM Framework

Schumacker and Lomax (2004), Kline (2005), and Hair, Black, Babin, Anderson, and Tatham (2010) outlined procedures for the analyses of latent variable models using structural equation modeling. In summary, these procedures can be generalized into six steps: (a) model specification, (b) model identification, (c) estimation, (d) testing, (e) modification, (f) interpretation and reporting. These six steps were used to develop and test the theoretical models of this study.

SEM provides two levels of analyses of the theoretical model. First level is the measurement model which shows the extent to which the measurement errors influence the data. At this level, some other underlying latent variable that has not yet been identified may also influence the data. The second level is the structural model which substantiates the causal relationships among the theoretical variables without the influence of measurement error. Together these two models are estimated to see whether they fit the theoretical model borne out by a goodness-of-fit test.

In this study, the construction of theory took a holistic approach by building and testing the measurement model and the structural model. The Analysis of Moment Structures, AMOS, SEM software, developed by Arbuckle (1983), tested the consistency of the data in the light of hypothesized relationships as demonstrated by the variance and covariance structures of the sample data. In other words, the operationalization of the conceptual variables and the subsequent analyses of the data gathered were related to the theory explicitly, not implicitly, as borne out by the results of the tests conducted using the AMOS software.

The questionnaire "IT Department's Role in Organizations" (see Appendix B), and used to collect sample data, employed the Likert type scale index measurement for measuring responses from survey respondents. Causal modeling as performed by the AMOS software analyzed the index measures in a series of iterations, called "minimization" in AMOS terminology, by solving a system of regression equations. According to Bentler (1980), from the standpoint of a causal model, a regression equation is described as a structural equation, and the parameters are described as structural parameters.

> Structural parameters presumably represent relatively invariant parameters of a causal process and are considered to have more theoretical meaning than ordinary predictive regression weights…There are exactly as many

> structural equations in a causal model as dependent variables…Independent variables need not be mutually statistically independent or uncorrelated. (Bentler, 1980, p. 422)

AMOS software provides six methods for estimating parameters – maximum likelihood (ML), generalized least squares (GLS), unweighted least squares (ULS), scalefree least squares (SLS), asymptotically distribution free (ADF), and Bayesian estimation. In this study, parameters were estimated using the ML method.

The AMOS software and SEM, in general, allow the researcher to test simultaneously all the hypothesized relationships among and between the variables based on the covariance in the sample data. The goodness of fit indices indicate how well the conjectured relationships among and between the variables are reflected in the estimated parameters.

Research Design

In this study, survey methodology was used as the research design, and structural equation modeling as the statistical procedure to test the conceptual model. The individual, a senior manager who has a perceptual view of the IT department's influence and power within the firm, was the unit of analysis in this study. In the following sections, the research design is described in detail. First, the six SEM analysis steps are described. Then, a description of the population, sample, and sampling procedure used for this study is presented, followed by measures used and the approach to ensuring their reliability and validity. Finally, the data analysis approach used is presented.

SEM Analyses Steps

This study adopted the SEM framework described previously. The following sections present a description of the conceptual model and the SEM procedures followed for developing, identifying, estimating and testing the models. Finally, the approach employed for interpreting and reporting the SEM analysis results are presented.

Model specification. This study used the two-step modeling approach recommended by James, Muliak, and Brett (1982). First, the measurement models were analyzed in order to assess the convergent and discriminant validity, and then the structural models were analyzed to assess the predictive validity (Anderson & Gerbing, 1988; Schumacker & Lomax, 2004). The reason for testing the measurement model before testing the structural model was stated succinctly by Joreskog and Sorbom (1993) as follows:

> The testing of the structural model, i.e., the testing of the initially specified theory, may be meaningless unless it is first established that the measurement model holds. If the chosen indicators for a construct do not measure that construct, the specified theory must be modified before it can be tested. Therefore, the measurement model should be tested before the structural relationships are tested. (Joreskog and Sorbom, 1993, p. 113)

This researcher followed the above scholars' advice in this study as it seemed prudent to do so. In the sections below, first a description of the conceptual model is presented followed by the specifications for measurement models and structural models.

Conceptual model. This study, sought to answer the question, does an influential IT department in a firm have a positive effect on the firm's IT orientation (IT savvy) and the firm's business performance. From the research model discussed in chapter 1 and literature review discussed in chapter 2, the hypotheses were that the IT department's influence and power positively affects the firm's IT orientation and business performance. The more influential the IT department in a firm, the more IT savvy the firm, and better the firm's business performance. Also, the IT orientation has a positive effect on the firm's business performance. On the other hand, how does IT department within a firm become influential? How does the IT department become relatively more influential than other departments? The hypothesis was that four antecedents positively affect the relative level of the IT department's influence and power within a firm. These antecedents are the IT department's capabilities. By using these capabilities, the IT department may gain a higher level of influence and power within the firm. Accountability is one capability that increases the relative level of influence and power. Innovativeness is another capability that enhances influence and perceived power. Customer connectedness is a third capability that can affect the relative influence and power levels. The ability to partner with other departments, collaboration with other departments within the firm is the fourth capability that enhances influence and power. Based on these theoretical assertions, a preliminary sketch of the model was developed as shown in Figure 10.

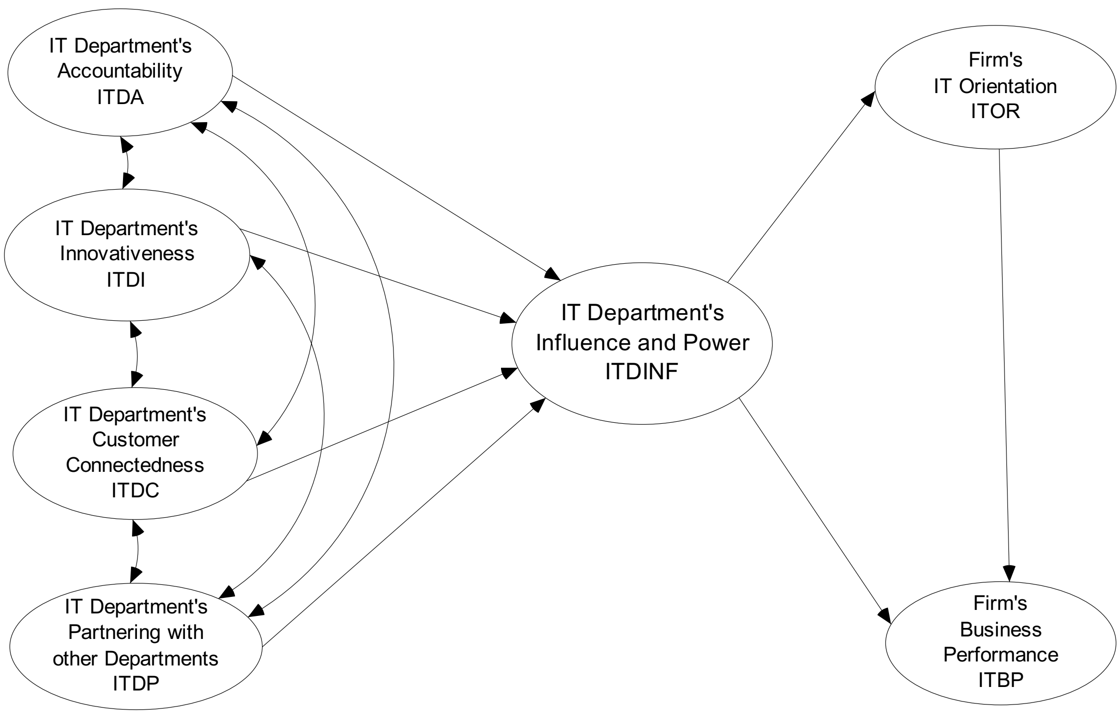

Figure 10 .Conceptual model of the antecedents of IT department's influence and power.

Figure 10 is a typical structural equation modeling graph of a conceptual model. The one-headed arrows indicate causal relations and the two-headed arched arrows indicate mutual dependencies (correlation). The ellipses are the latent variables or latent factors. According to Byrne (2001), the structural equation model might be misspecified if unimportant factors are included, which could result in loss of estimation accuracy, or important factors are excluded, which could result in biased parameter estimates. A misspecified model cannot adequately reproduce the observed covariance and hence will not fit the data (Byrne, 2001).

Measurement models. Since the variables in the conceptual model are latent (not directly observable), a measurement model was specified. Observable variables were constructed which were expected to measure the latent variables. The observable variables were the items on the survey instrument. The measurement model defined the relationships between the observable variables and the latent variables.

The IT department's influence and power was measured using two indices namely perceived power and respect at the top management level. The notion here is that the perception within the firm that the IT department is influential makes it influential. The organizational perception was measured using responses to a set of survey items and a measurement scale. The idea was that if the top management including the CEO and the top management team respected the IT department then the organization would perceive the IT department as influential. The perception of power and respect at top management level were both measured using responses to a set of survey items and a Likert type measurement scale anchored at 1 = *strongly disagree* and 6 = *strongly agree*. The IT orientation was measured using nine items on the survey. The business performance latent variable was measured using 10 items on the survey. The antecedents of the IT department's influence and power were also measured using survey items. Likert type measurement scales anchored at 1= *strongly agree* and 6 = *strongly disagree* were used for these indicators also. Items used for measuring each of these constructs are listed in Appendix A and Appendix B. The specific items comprising the measurement scale are discussed in the section "Measures and Survey Instrument."

The theoretical model in this study was decomposed into four measurement models consisting of four major latent construct groups: (a) antecedent variables construct made up of four latent (unobserved) factors namely accountability, innovativeness, customer connectedness, and partnering with other departments; (b) the single latent variable model of IT department influence and power construct; (c) the single latent variable model of firm's IT orientation construct; and (d) the single latent variable model of the firm's business performance construct. In AMOS software program, these four measurement models were setup as shown in Figures 11 through 14. The ellipses in these figures represent the latent variables and the rectangles represent the indicator variables (manifest variables) which are the survey items.

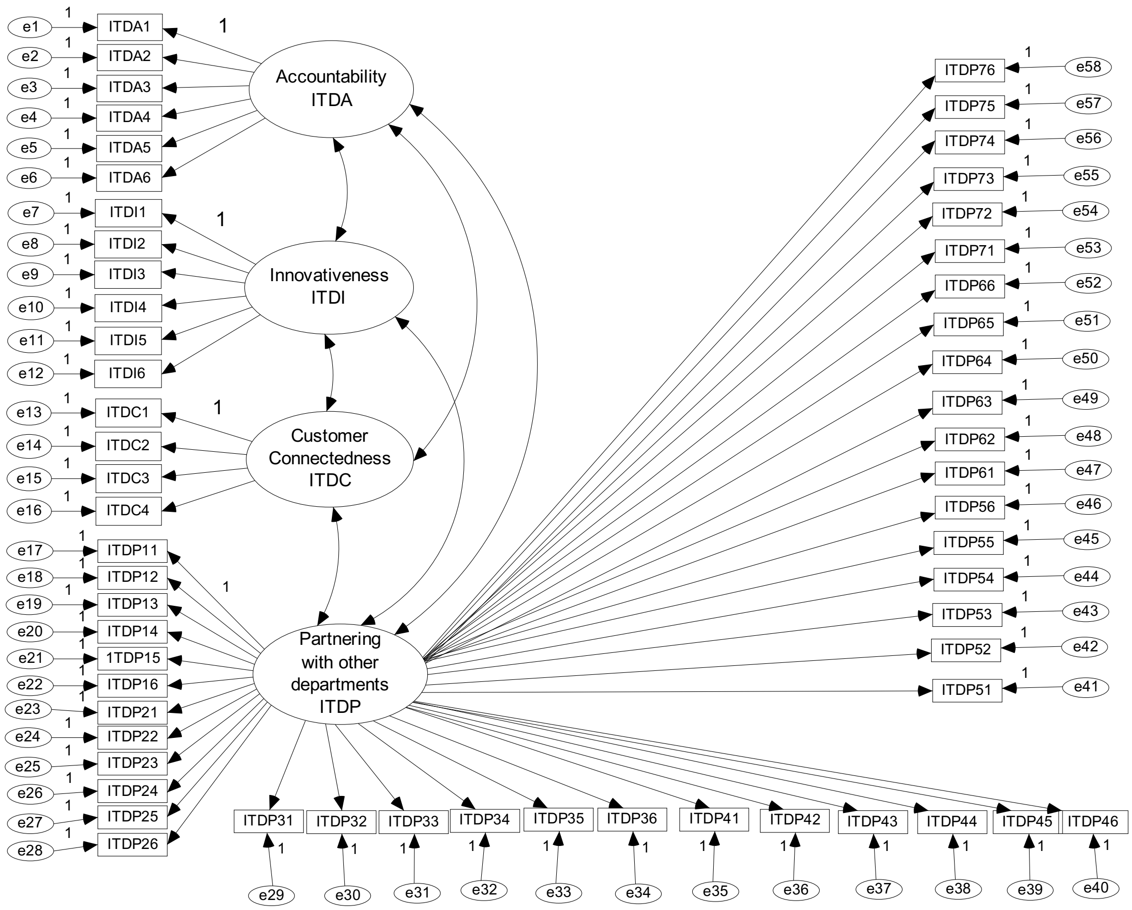

Figure 11. Antecedent variables construct.

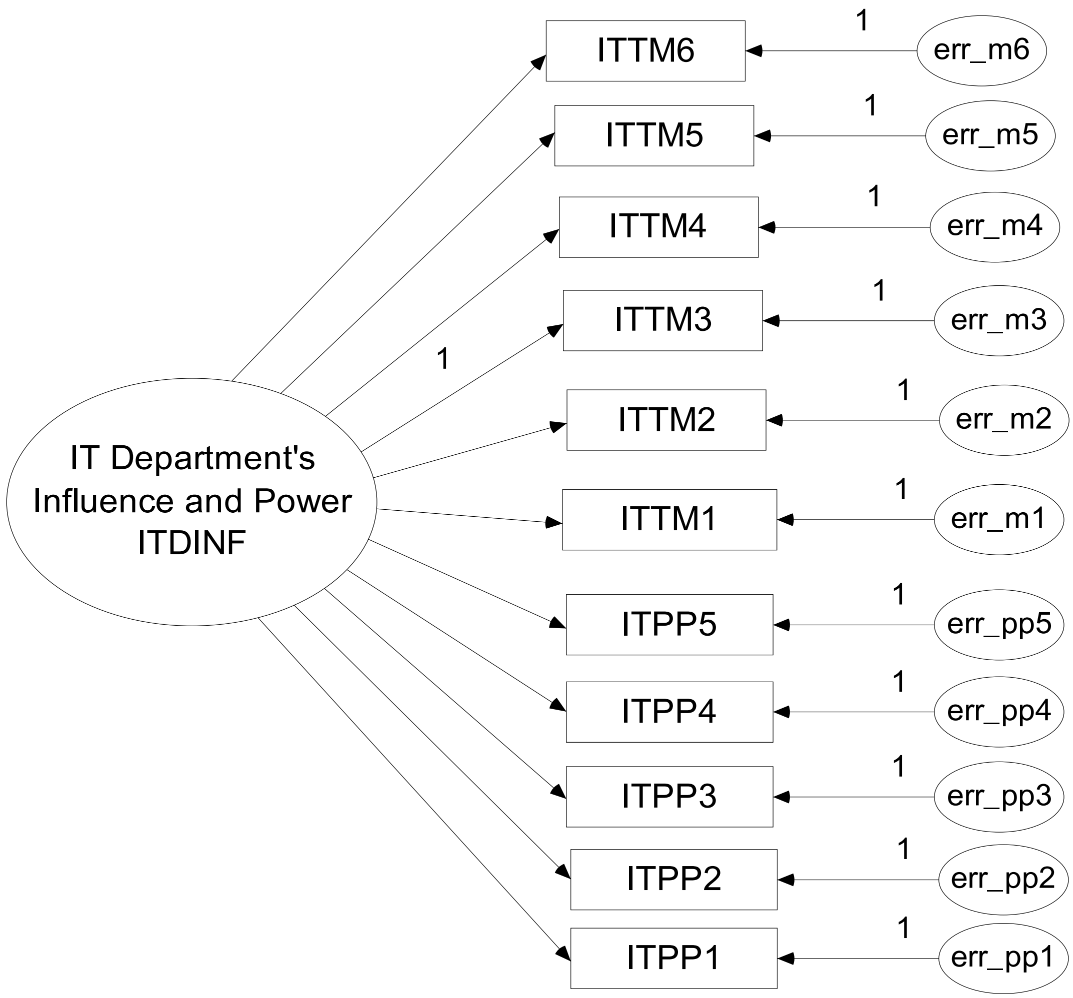

Figure 12 . IT department's influence and power construct.

Note: ITPP = IT department’s perceived power; ITTM = Respect at the top management level for the IT department.

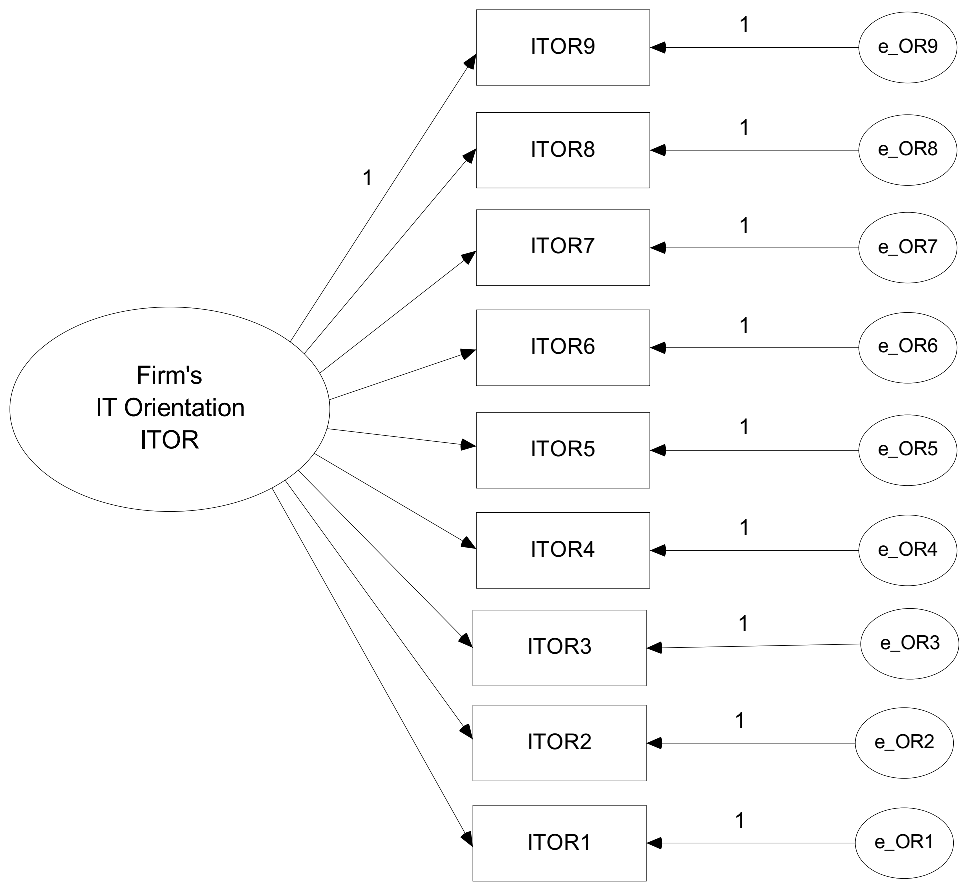

Figure 13 .IT orientation construct.

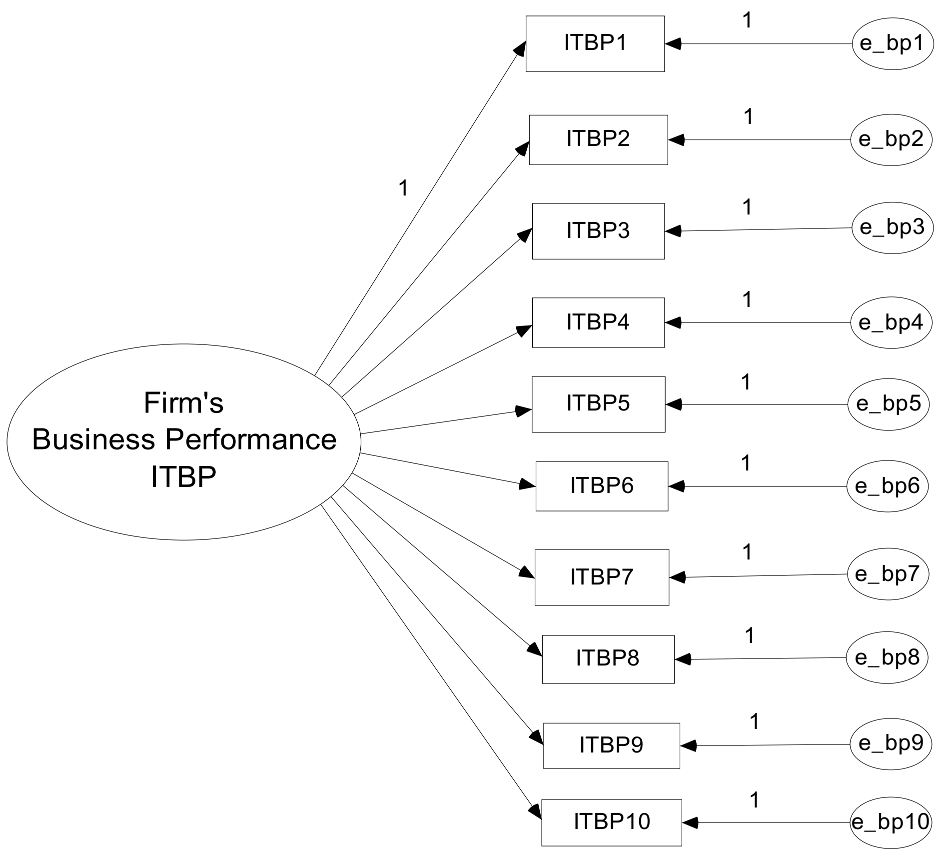

Figure 14 .Business performance construct.

The scores from the samples on the survey instrument were analyzed to see how each measure loaded on the latent variables and measured the constructs they were designed to measure.

Structural models. Four structural relationships exist in the theoretical model of this study: (a) relationship between the antecedent variable construct and the IT department's influence and power construct; (b) relationship between the IT department's influence and power construct and the IT orientation construct; (c) relationship between the IT department's influence and power construct and the business performance construct; (d) relationship between the IT orientation construct and the business performance construct. The structural model specifies how the latent variables influence one another directly or indirectly to change their values (Byrne, 2001) “incorporating the specified measurement error variances” (Smith, & Langfield-Smith, 2004). An overall structural model was setup in the AMOS software program and tested to determine the significance of each structural relationship.

Model identification. In structural equation modeling, the estimated parameters are functions of the sample covariance. That is, the model is a set of equations with unknown parameters. If the equations can be solved resulting in a unique value for each unknown, then the model is said to be *identified*. Otherwise, the model is said to be *underidentified*. Stated another way, using the sample data contained in the covariance matrix S and the theoretical model data represented by the population covariance matrix Σ, if a unique set of model parameters can be estimated then the model is said to be identified. This model identification procedure is analogous to the theoretical model represented by $a + b =$ some value, and the sample data indicating that $a + b = 25$, there is no unique solution to this equation because neither a nor b is constrained to a specific value. To solve this problem, either a or b has to be fixed to a value, say 1, then the equation has a unique solution, $b = 24$. Thusly, the identification problem has been solved in this instance by imposing a constraint on one of the variables. AMOS software program uses this procedure to solve the covariance matrix and to find a unique parameter estimate. In order to estimate the parameters in the four measurement models using AMOS, one parameter for each latent variable was constrained to 1. For example, (referring to Figure 11):

$$ITDA = \lambda_1 ITDA1 + \lambda_2 ITDA2 + \lambda_3 ITDA3 + \lambda_4 ITDA4 + \lambda_5 ITDA5 + \lambda_6 ITDA6 + \Sigma \text{ error} \qquad (2)$$

In order to solve the covariance matrix and estimate the parameters (regression coefficients) λ_1 λ_2 λ_3 λ_4 λ_5 λ_6 for ITDA1 through ITDA6, one parameter, say λ_1, was constrained, say, to λ_1=1.

This procedure was followed throughout the model identification process in this study.

Traditionally, researchers refer to three levels of model identification (Schumacker & Lomax, 2004): the model is said to be *underidentified* if one or more parameters cannot be solved uniquely on the basis of the covariance matrix S (more unknown parameters than equations); the model is said to be *just-identified* if there is just enough information in the covariance matrix S to solve the parameters of the model (equal number of equations as unknown parameters); the model is said to be *over-identified* when there is more than one way to estimate the unknown parameters (more equations than unknowns). According to Schumacker and Lomax (2004), a necessary condition for model identification is that "the number of free parameters to be estimated must be less than or equal to the number of unique values in the covariance matrix S" (p. 64). In other words, only the diagonal variances and one set of the off-diagonal covariances are counted. The current study model was not underidentified for the following three reasons. First, in this study, each latent variable has four or more indicators and the sample size was large enough. This prevented underidentification of the model (Loehlin, 2004). Second, there were no reciprocal paths and feedback loops in the model and, therefore, differences in identification (overidentification in one part and underidentification in another) did not arise (Loehlin, 2004). Third, the AMOS software ensured that the latent variable scales were determined by fixing either the variance or a path to an observed variable. If this was not done, AMOS alerted the researcher as to which parameter was not identified and recommended adding a constraint to eliminate the problem. Notwithstanding these precautionary measures and prevention techniques, in order to test whether there was underidentification, in this study, the overall model was tested using the AMOS software with two different sets of start values. If the AMOS program arrived at two solutions with identical Chi-square but different values for one or more estimated parameters, then the model would be an underidentified model (Loehlin, 2004). That was not the case in this study.

Model Estimation. The desired estimation result is that the difference between the theoretical (implied) covariance matrix Σ and the observed sample covariance matrix S is zero which means the model fits the data perfectly. This is generally not the case in practice. In the absence of a perfect fit, the next best result is that the model fits the data as closely as possible. In other words, the estimation process needs to find parameter values such that the theoretical covariance matrix Σ is as close as possible to the observed covariance matrix S. The estimation process involves a fitting function which minimizes the difference between Σ and S. AMOS software program offers several estimation processes. The maximum likelihood (ML) process was used for unknown parameter estimation in this study.

Model Testing. The model in this study was overidentified, meaning the number of observations exceeded the number of parameters to be estimated. Kline (2005) advised that usually overidentified models "do not perfectly fit the data" (p. 133). Therefore, model testing in this study implied the determination of "how well the data fit the model" (Schumacker & Lomax, 2004, p. 69). Stated differently, to what extent does the theoretical model describe the sample data? Therefore, there was a need to measure the degree of fit of the model. In this study, to assess the degree of model fit, testing was conducted at two levels.

The first level test was the "global-type omnibus test" of the fit of the overall model (Schumacker & Lomax, 2004, p. 69). The global test in SEM is called the model fit criteria. The objective here was to test the researcher's *a priori* hypothesis that the researcher's theoretical model was good, that it closely represented reality, and that there were no problems with it. This was a test based on a plethora of fit indices. Kline (2005) recommended a minimum set of index values as the criteria to test the goodness of fit. These statistics include (a) the model chi-square; (b) Stiger-Lind root mean square error of approximation (RMSEA) with its 90% confidence interval; (c) the Bentler comparative fit index (CFI); and (d) the standardized root mean square residual (SRMR).

The second level test was the examination of the fit of individual parameters of the model. Three key features were examined. The first feature examined was whether a free parameter was significantly different from zero (Schumacker & Lomax, 2004; Arbuckle, 2009). AMOS software program obtains the parameter estimates from solving the covariance matrix, and also computes the standard error for each parameter estimate. The ratio of parameter estimate to standard error is the z-value called the *critical ratio* (C.R.) which is assumed to be normally distributed. That means the estimated parameter is above or below zero by the amount of the *critical ratio* value. For example, for a given $\propto$ level of 0.05, if the z-value is 1.96 for a two-tailed test, then the estimated parameter is 1.96 standard errors above zero and is said to be significantly different from zero (Schumacker & Lomax, 2004; Arbuckle, 2009), the higher the critical ratio value the better. The second feature of the estimated parameters examined was their sign, whether the signs of the estimated parameters were as expected by the theoretical model. For example, in this study, since the theoretical model expected that the IT department's influence and power within the firm had a positive effect on the firm's IT orientation, the estimated parameter for this structural relation had to be a positive value to support that expectation. The third key feature examined was the magnitude of the parameter estimates themselves. In this study, the parameter estimates were examined to see if they were within an expected range of values and made sense (Schumacker & Lomax, 2004). For example, variances were not expected to be negative values and correlations were not expected to be greater than one. The results of the study met these expectations.

Reporting and Interpretation. There is a wide variety of opinion regarding the contents of an SEM analysis report. There is, however, agreement that one should avoid the shotgun approache of reporting everything, which seems to imply the researcher, is on a fishing expedition. McDonald and Ho (2002) conducted a survey of studies which used SEM in order to compare practice with the principles of reporting SEM analysis. They recommend that every report give a detailed justification of the model used, along with an account of identifiability. McDonald and Ho (2002) also recommended that nonnormality and missing data problems should also be addressed. A complete set of parameters and their standard errors, the correlation matrix and discrepancies, as well as goodness-of-fit indices, should be reported so that the "readers can exercise independent, critical judgment" (McDonald & Ho, 2002, p. 64). Garson, (2009) recommended reporting chi-square (CMIN), RMSEA, and one of the baseline fit measures (NFI, RFI, IFI, TLI, CFI); and if there is model comparison, also reporting one of the parsimony measures (PNFI, PCFI) and one of the information theory measures (AIC, BIC, CAIC, BCC, ECVI, MECVI). Following these guidelines, this study reported the goodness fit measures shown in Table 5.

Table 5.

Reporting SEM Analysis - Fit Indices

Test Statistics	Critical Value	Interpretation
Chi-squared Tests	Chi-squared = not significant	Good fit to the just identified model
	Chi-squared/df < 5	
Normed Chi-squared test		Good fit to the just identified model
Goodness of fit index (GFI)	0.9 < GFI < 1	Good fit to the just identified model
Standardized root mean squared residual (SRMR)	0 < SRMR < 0.08	Good model fit
Root mean square error of approximation (RMSEA)	0 < RMSEA < 0.08	Good model fit
Normed fit index (NFI)	0.9 < NFI < 1	% improvement over null model
Relative fit index (RFI)	0.9 < RFI < 1	% improvement over null model
Incremental fit index (IFI)	0.9 < IFI < 1	% improvement over null model
Comparative fit index (CFI)	0.9 < CFI < 1	% improvement over null model

Note. Adapted from Arbuckle & Wothke, 1999; Byrne, 2001; Hair, et al., 2010; Ho, 2006; Kline, 1989

Regarding the interpretation of the fit indices shown in Table 5, Garson (2009) warns that a "good fit" is not the same as strength of relationship:

> [O]ne could have perfect fit when all variables in the model were totally uncorrelated, as long as the researcher does not instruct the SEM software to constrain the variances. In fact, the lower the correlations stipulated in the model, the easier it is to find "good fit." The stronger the correlations, the more power SEM has to detect an incorrect model. When correlations are low, the researcher may lack the power to reject the model at hand. Also, all measures overestimate goodness of fit for small samples (<200). (p. 26)

The preceding guidelines were followed in the reporting and interpretation of the analysis results in this study. An interpretation of the GFI is that how well the model explains the data. The acceptability criterion is that the GFI for a model should be at least 0.9, or the model should explain at least 90% of the data. The comparative fit indices NFI, RFI, IFI and CFI estimate "how close to a very good fit the data and the path depiction are on a scale between zero and unity" (Arbuckle & Wothke, 1999, p. 409). These indices compare the fit of the default model (the measurement mode) to the null or the independence model. Although there are "no clearly established rules as to what constitutes a good fit" (Ho, 2006, p. 300), a widely applied rule of thumb for these fit indices is 0.9 as the cut off value for acceptance of good fit (Bentler, 1980; Bentler & Bonett, 1980). According to Ho (2006), values ranging from 0.89 to 94 for these indices indicate a good fit. This is interpreted as the model should be at least 89% to 94% of a very good fit. The analyses results and interpretations are presented in chapter 4.

Population, Sample, and Sampling Procedure

The population for this study was approximately 1,000,000 executives of public and private firms including advertizing, air transportation, banking, computers and communication, electrical and electronics manufacturing, home healthcare, insurance, medical equipment, metals and plastics manufacturing, oil and gas companies in the United States. The firms operated in diverse industries and the public firms traded their stock on the New York Stock Exchange or the NASDAQ. Generally, modern companies of today, public and private, cannot operate without information communication technologies. Specifically, publicly traded firms generally have an IT department. Private companies may or may not have an IT department. However, it was expected that even small private firms use some level of information communication technologies for conducting their business.

The key informants were expected to be experienced professionals in their field of work and have perceptions about IT services they have experienced. Also, the Securities and Exchange Commission (SEC) requires the publicly traded companies in the United States to submit an annual Form 10-K containing a comprehensive detail of the company's performance, on the contrary private companies do not file form 10-Ks. Compared to the publicly traded companies, private companies disclose less information to the competitors. Publicly traded companies are under constant pressure by the regulatory agencies to meet quarterly projections for sales and profits. In 2001, the U.S. Congress enacted the Sarbanes–Oxley Act of 2002 to protect investors in publicly traded companies by improving the accuracy and reliability of corporate disclosures (Brown & Nasuti, 2005). This law makes the CEO and the CFO each personally responsible for ensuring the credibility of the financial reporting provided to stakeholders. CEOs and CFOs may require their IT organizations to "provide proof that automated portions of financial processes have appropriate controls, that computer-generated financial reports are accurate and complete, and that any exceptions are captured and reported in a timely manner" (Kaarst-Brown & Kelly, 2005, p. 4).

The publicly traded companies generally have a designated senior executive responsible for managing these expectations and the IT function. With increasing use of the Internet and e-business technologies, the increasing complexity of information technology architecture, and increasing complexity of technology in general the countries and governments are focusing on information security, privacy, and environmental concerns. Consequently, many regulations have come into force in the US and Europe: the Health Insurance Portability and Accountability Act of 1996 (HIPAA), the Gramm–Leach–Bliley Act of 1999 (GLBA), the Fair Credit Reporting Act (FCRA), the Notification of Risk to Personal Data Act (NORPDA), Registration, Evaluation and Authorization of Chemicals (REACH), and Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (ROHS) to name a few. To comply with these regulations the publicly traded companies have to store, track, and retain enormous amount of electronic data. Publicly traded companies generally implement and use IT solutions including accounting systems, factory systems, enterprise resource planning systems, to conduct their business and gain competitive advantage.

Determining Sample Size

There is no unique answer to the sample size determination in SEM. Researchers in exploratory factor analysis and principal components analysis, both of which are used in SEM studies, are entrenched in two camps regarding the appropriate sample size – those looking at absolute sample size and those looking at ratios to determine sample size (Osborne & Costello, 2004). Some researchers (e.g., Hoyle, 1995; Loehline, 1992) recommended determining sample size based on the number of samples per survey item (subjects to variables ratio or STV) and no less than three samples per survey item. Based on this criterion, with 88 survey items which operationalize the eight major theoretical constructs, this study required a minimum of 264 completed survey responses.

Some SEM researchers (e.g., Schumacker & Lomax, 2004, pp. 48-50; Kline, 2005, p. 15) suggested that a minimum sample size of 200 was required for conducting full SEM analysis. Schumacker and Lomax (2004) suggested that the conventional power analysis at p = .05 level of significance the two-tailed test, with critical ratio of 1.96 is acceptable for significance test when considering Type I error (p. 114). Comfrey and Lee (1992) suggested that "the adequacy of sample size might be evaluated very roughly on the following scale: 50 – *very poor*; 100 – *poor*; 200 – *fair*; 300 – good; 500 – *very good*; 1000 or more – *excellent*" (p. 217).

Osborne & Costello (2004) concluded regarding sample size that more is always better. The participants considered for this study were at the upper management level including senior managers, directors, vice presidents of the organizations surveyed. Based on published literature, a sample size of 300 is considered *good* and 500 *very good*. This research obtained a reasonably good sample size of 349 for conducting full SEM analysis for this study.

Sampling Procedure

This study followed Dillman's (2000) approach to develop and administer the questionnaire. All variables of interest were estimated through respondents' perceptual evaluation on a six-point Likert-type scale, which are anchored by 1 (*Strongly Disagree*) and 6 (*Strongly Agree*). The survey and data collection was delimited to the companies and respondents located in North America. The measurement items were developed in English, and also the survey was conducted in English.

According to Singleton and Straits (2005), a self-administered web-based data collection method is efficient and effective when collecting data from a targeted population (p. 244). Specifically, advantages associated with web-based self-administered surveys include convenience, privacy, speed and significant cost savings (Singleton & Straits, 2005, p. 244). A weakness of the self-administered surveys is lower response rates ranging from 50% to up to 75%. The response rate for the survey in this study was known to be considerably lower due to the population comprised of senior level executives who are generally not responsive to surveys.

During the last decade, researchers and practitioners employing surveys for research have relied heavily on the World Wide Web for data collection. Some researchers (e.g., Braunsberger, Wybenga, & Gates, 2007; McGraw, Tew, & Williams, 2000) demonstrated that data collected using web-delivered surveys and online panels can yield reliable and valid results. Ad hoc recruitment and prerecruitment are the two methods by which potential participants are enrolled to respond to survey questions online. In ad hoc recruitment, participants are solicited through mailing lists on the basis of a proposed study. Ad hoc recruitment is often costly, and its success is not predictable. Consequently, prerecruitment is employed by many research organizations.

Couper (2000) classified online Web survey participants (Web panels) into prerecruited probability-based Web panels or volunteer opt-in panels (see also Sheehan, 2002). Prerecruited probability Web panels consist of respondents selected using a probability method such as enrolling panel members through random-digit dial (RDD) telephone sampling. The panel members may also be enlisted by email, mail or face-to-face, as long as there is a known nonzero probability of selection from a given sampling frame.

Knowledge of the sampling frame and the recruitment methodology enables the researcher to measure coverage and non-response error which could be used for proper weighting and adjustment of the recruited participant data. Volunteer panels of Web users (Couper, 2000) or opt-in panels are composed of respondents who voluntarily sign up (opt-in) to become members of the panel. These respondents might have found out about the panel via word of mouth, any kind of advertisement or referral, or been recruited via pop-ups or other methods of discovery.

Recently, some Websites have been specifically designed to “sign up” respondents to several opt-in panels at once. Examples are surveymonster.net and yellowsurveys.com. In contrast to ad hoc recruitment, Web panels reduce the cost associated with locating appropriate respondents and ensure their immediate availability.

Although the risk of non-response bias due to lack of access to computers could be a problem in web-based surveys (Singleton & Straits, 2005), the present study surveyed senior managers and executives and access to computers was not a problem for this population. Therefore, non-response bias due to technology was not a concern to this study given the sophisticated and controlled population group of senior management personnel.

This study used a Web panel of opt-in survey respondents developed by MarketTools (www.markettools.com) which is a specialized online survey panel company that recruits and maintains relationships with millions of survey volunteers. The Web panel company MarketTools (www.markettools.com) was able to create samples that closely matched the specific population of the current study. The voluntary respondent attributes included (a) senior executives including C-level executives, vice presidents, senior directors and directors of companies; (b) publicly traded firms with sales revenue of $100 million and above and private firms with experience, knowledge and use of information technology; (c) the functions performed by the panel members included engineering, manufacturing, operations, research and development, sales, marketing and quality assurance; (d) the industry type considered included manufacturing, retail, and finance/banking/insurance. Since the panel members were voluntary participants, this researcher expected to obtain about 350 completed responses without any problem. The survey was administered to the Web panel with the above attributes through the online survey administration company Zoomerang (www.zoomerang.com) and completed surveys were obtained.

Measures and Survey Instrument

The following sections present the operationalization of latent variables. Each theoretical construct was operationalized using a set of items as proxies. The majority of the items were adapted from various published sources, and some were added to enhance the scales. The items were assembled into a survey questionnaire consisting of 32 questions. Sixteen questions consisting of 88 subscale items operationalized the major theoretical constructs. Ten questions containing 33 subscale items operationalized the covariates and control variables. The remaining six questions were included to collect data on the respondents' background including position held, years of experience, age, and gender. The survey items and their sources are summarized in Appendix A. The final survey titled "The IT department's role in organizations" is included in Appendix B.

Accountability Measure

Based on literature review, the inability to account for its contribution may undermine the IT department's influence and power within the firm (Love, Ghoneim, & Irani, 2004; Lacity, Willcocks, & Feeny, 1996; Katz, 1993; Ragowsky, Licker, & Gefen, 2008). As discussed in the preceding sections, the IT department's accountability may be perceived by the non-IT departments in two ways – its ability to link its activities to financial outcomes and its ability as an internal service provider. Moorman and Rust (1999) used perceptual measures to collect data on marketing department's importance within the firm. Their approach was used in this study to ask potential respondents firm level questions regarding the IT department. For example, one question was "The IT department in my company is effective at linking their activities to financial outcomes." Items were also included asking the respondents' customer service perspective. For example, another question was "The IT department in my company provides high quality service to internal user community."

The final measurement scale for the *accountability* construct consisted of six items listed in question 1 on the survey shown in Appendix A, and Appendix B. The six items were scored on a 6-point Likert type scale as 1 = *never*, 2 = *rarely*, 3 = *somewhat occasionally*, 4 = *somewhat often*, 5 = *often*, and 6 = *extremely often*. Each questionnaire item was coded as ITDA1, ITDA2, ITDA3, ITDA4, ITDA5, and ITDA6. Respondent's score for each item was added, and mean score calculated for the *accountability* measure, which was coded as ITDA, for each respondent using SPSS version 17 software.

$$ITDA = (ITDA1+ITDA2+ITDA3+ITDA4+ITDA5+ITDA6)/6 \quad (3)$$

Assessment of this measure based on a sample of 349 cases showed a Cronbach's alpha value of 0.956.

Innovativeness Measure

When an individual or a group is effective at inventing new methods for solving problems it develops a perception that the individual or group is creative or innovative. This researcher adapted questions from Pallister and Foxall (1998) who appraised the psychometric properties of the scales for the measurement of innovativeness devised by Hurt, Joseph and Cook in 1977. For example, one item for measuring innovativeness is “The IT department in my company invents methods for solving problems when an answer is not apparent.” The productive use of that innovativeness is also important: does the organization perceive the IT department to be supporting the innovativeness of non-IT departments? To address this issue questions from Stratman and Roth (2002) and Pallister and Foxall (1998) were adapted. For example, one item is “The IT department in my company offers new ideas on how IT can be used to improve business processes to achieve business goals.” Another item is “The IT department in my company comes up with new and novel ideas to help the users in my department do their job better.” Additional items were constructed so that the items chosen from existing literature could be enhanced (see Appendix B).

The final measurement scale for *innovativeness* consisted of six items listed in question 2 on the survey shown in Appendix A and Appendix B. The six items were scored on a 6-point Likert type scale as 1 = *never*, 2 = *rarely*, 3 = *somewhat occasionally*, 4 = *somewhat often*, 5 = *often*, and 6 = *extremely often*. Each questionnaire item was coded as ITDI1, ITDI2, ITDI3, ITDI4, ITDI5, and

ITDI6. Respondent's score for each item was added, and mean score calculated for the innovativeness measure, which was coded as ITDI, for each respondent using SPSS version 17 software.

ITDI = (ITDI1+ITDI2+ITDI3+ITDI4+ITDI5+ITDI6)/6 (4)

Assessment of this measure based on a sample of 349 cases showed a Cronbach's alpha value of 0.967.

Customer Connectedness Measure

A measurement scale for IT department's customer connectedness was not available in the existing literature. Based on the idea that the non-IT departments perceive the IT department as knowing the firms customers, this researcher constructed an attitude-based 4-item operationalization. For example, if the non-IT departments such as marketing and sales believe that the IT department understands customers then they are more likely to involve the IT department in all the customer relationship activities. Based on this behavior, an example survey item is "our marketing and sales people routinely consult our IT department regarding customer's needs."

The final measurement scale for the *customer connectedness* measure consisted of four items listed in question 3 of the survey (see Appendix A, and Appendix B). The four items were scored on a 6-point Likert type scale as 1 = *never*, 2 = *rarely*, 3 = *somewhat occasionally*, 4 = *somewhat often*, 5 = *often*, and 6 = *extremely often*. Each questionnaire item was coded as ITDC1, ITDC2, ITDC3, and ITDC4. Respondent's scores were added, and the mean score calculated for the customer connectedness measure, which was coded as ITDC, for each respondent using SPSS version 17 software.

$$ITDC = (ITDC1+ITDC2+ITDC3+ITDC4/4 \qquad (5)$$

Assessment of this measure based on a sample of 349 cases showed a Cronbach's alpha value of 0.896.

Partnering with Other Departments Measure

Stank, Daugherty, and Ellenger (1999) developed and tested an operationalization of the frequency with which personnel from logistics department engaged in collaborative activities with personnel from the marketing department. They used a 7-item attitude-based measure which included: informally working together; sharing ideas, information, and/or resources; working together as a team; conducting joint planning to anticipate and resolve operational problems; achieving goals collectively; developing a mutual understanding of responsibilities; making joint decisions about ways to improve overall cost efficiency. This researcher adapted these measures and constructed a 7-item scale. For example, one item reads my Company's IT department, has an informal working relationship with Marketing/Sales, HR/Personnel, R&D/Engineering, Manufacturing/Operations, Customer Service, and Accounting/Finance.

The final measurement scale for the *partnering with other departments* measure consisted of six items listed in seven questions - question 4 through question 10 - of the survey (see Appendix A, and Appendix B) The six items were scored on a 6-point Likert type scale as 1 = *never*, 2 = *rarely*, 3 = *somewhat occasionally*, 4 = *somewhat often*, 5 = *often*, and 6 = *extremely often*. Each questionnaire item in each question of the seven questions were coded as ITDP11, ITDP12, ITDP13, ITDP14, ITDP15, ITDP16, ITDP21, ITDP22, ITDP23, ITDP24, ITDP25, ITDP26, ITDP31, ITDP32, ITDP33, ITDP34, ITDP35, ITDP36, ITDP41, ITDP42, ITDP43, ITDP44, ITDP45, ITDP46, ITDP51, ITDP52, ITDP53, ITDP54, ITDP55, ITDP56, ITDP61, ITDP62, ITDP63, ITDP64, ITDP65, ITDP66, ITDP71, ITDP72, ITDP73, ITDP74, ITDP75, ITDP76. Respondent's score for each item and each question was added, and mean score calculated for partnering with other departments measure, which was coded as ITDP, for each respondent using SPSS version 17 software..

ITDP = ((ITDP11+ITDP12+ITDP13+ITDP14+ITDP15+ITDP16)/6 +
(ITDP21+ITDP22+ITDP23+ITDP24+ITDP25+ITDP26)/6 +
(ITDP31+ITDP32+ITDP33+ITDP34+ITDP35+ITDP36)/6 +
(ITDP41+ITDP42+ITDP43+ITDP44+ITDP45+ITDP46)/6 +
(ITDP51+ITDP52+ITDP53+ITDP54+ITDP55+ITDP56)/6 +
(ITDP61+ITDP62+ITDP63+ITDP64+ITDP65+ITDP66)/6 +
(ITDP71+ITDP72+ITDP73+ITDP74+ITDP75+ITDP76)/6)/7 (6)

Assessment of this 7-item scale based on a sample of 349 cases showed a Cronbach's alpha value of 0.993.

Measures for IT Department's Influence and Power

Based on literature review, the IT department's influence and power was operationalized as two definitional components – influence and power possessed by the IT department as perceived by the non-IT departments and respect at the top management level for the IT department. The perceptions of non-IT executives that IT department delivers business benefits may affect the IT department's ability to influence them positively. Consequently, the top management executives may develop a sense of respect for the IT department. These attitudes may allow the non-IT department executives and the top management team members to include the IT department in strategic decision making which in turn may further enhance IT department's influence and power within the firm.

Measure for IT Department's Perceived Power. Based on the approach of Moorman and Rust (1999), a 5-item scale was constructed to measure the IT department's perceived power using an attitude-based scale. For example, one item is "the IT department in my company is generally considered to be more important than other departmental functions." Scale items were also added to take into account the participation in strategic decision making as a consequence of possessing influence and power. For example, "the IT department in my company always actively participates in and contributes to strategic decision making."

The final measurement scale for *perceived power* consisted of five items listed in question 11 of the survey (see Appendix A, and Appendix B). The five item 6-point Likert type scale was scored as 1 = *strongly disagree*, 2 = *disagree*, 3 = *somewhat disagree*, 4 = *somewhat agree*, 5 = *agree*, and 6 = *strongly agree*. Each questionnaire item was coded as ITPP1, ITPP2, ITPP3, ITPP4, and ITPP5. Respondent's scores for each item were added, and mean score calculated for the perceived power measure, which was coded as ITPP, for each respondent using SPSS version 17 software.

$$ITPP = (ITPP1+ITPP2+ITPP3+ITPP4+ITPP5)/5 \tag{7}$$

Assessment of this operationalization based on a sample of 349 cases showed an acceptable Cronbach's alpha score of 0.938.

Measure for Respect at Top Management for the IT Department. Top management respect focuses on the perceived respect for the IT department among the top management team (TMT) members including the CEO, CFO, COO, executive vice presidents, and the board of directors who are responsible for setting direction and making strategic decisions for the company. Following Teo and King's (1997) operationalization of IT importance, top management's respect for the IT department is measured using attitude based scale items in terms of top management's commitment to the IT function, recognition that IT is essential to the success of the firm, and the view that IT spending is an important and strategic investment. An example item is "The top management in company admits that IT department is critical to our company's success."

The final measurement scale for *respect at the top management* measure consisted of six items listed in survey question 12 shown in Appendix A and

Appendix B. The six item 6-point Likert type scale was scored as 1 = *strongly disagree*, 2 = *disagree*, 3 = *somewhat disagree*, 4 = *somewhat agree*, 5 = *agree*, and 6 = *strongly agree*. Each questionnaire item was coded as ITTM1, ITTM2, ITTM3, ITTM4, ITTM5, and ITTM6. Three items were reverse scored to minimize response set bias. ITTM4 ("Top management in my company thinks that IT department is a ridiculously expensive department"), ITTM5 ("Top management in my company shows indifference towards the IT department"), and ITTM6 ("The top management in my company considers IT spending as painful but necessary expense to do business") were scored as 6 = *strongly disagree*, 5 = *disagree*, 4 = *somewhat disagree*, 3 = *somewhat agree*, 2 = *agree*, and 1 = *strongly agree*. Respondent's scores were added, and mean score calculated for the respect at top the management measure, which was coded as ITTM for each respondent using SPSS version 17 software.

$$ITTM = (ITTM1+ITTM2+ITTM3+ITTM4+ITTM5+ITTM6)/6 \quad (8)$$

Assessment of this operationalization based on a sample of 349 cases showed an acceptable Cronbach's alpha score of 0.843.

IT Orientation Measure

A nine-item scale was constructed to measure the IT orientation. To measure the management perception that their employees are generally technology savvy and eager to learn new technology, items such as "in my Company managers and employees are generally technology savvy" were included. People who are technology savvy or technology oriented in their thinking also know how to exploit technology to their advantage in whatever they do in their daily lives. People use email, mobile devices and personal digital assistants to communicate, to remind them of pending tasks, to keep track of their contacts. In today's workplaces people are generally aware of the recent developments in information technologies and how they are useful in improving the business processes. They are knowledgeable enough to decide what IT tools they want to do their jobs better. To measure this independent thinking and choice about information technology within the firm, some items were added including "in my company IT does not decide what software solutions managers and employees need," and "managers and employees are well aware of information technology solutions available in the market."

The final measurement scale for measuring *IT orientation* consisted of nine items and is listed in survey question 27 in Appendix A and Appendix B. The nine item 6-point Likert type scale will be scored as 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, and 6 = strongly agree. Each questionnaire item was coded as ITOR1, ITOR2, ITOR3, ITOR4, ITOR5, ITOR6, ITOR7, ITOR8, and ITOR9. In order to minimize response set bias, item ITOR8 ("When software training is offered attendance is generally very poor") and ITOR9 ("Managers and employees don't believe they need IT to do their job better") were reverse-scored. These two items were scored as 6 = strongly disagree, 5 = disagree, 4 = somewhat disagree, 3 = somewhat agree, 2 = agree, and 1 = strongly agree. Respondent's scores were added, and mean score calculated for the *respect at top the management* measure, which was coded as ITOR, for each respondent using SPSS version 17 software.

$$ITOR = (ITOR1+ITOR2+ITOR3+ITOR4+ITOR5+ITOR6+ITOR7+ITOR8+ITOR9)/9 \quad (9)$$

Assessment of this measure based on a sample of 349 cases showed a Cronbach's alpha value of 0.856.

Business Performance Measure

In this study, business performance was a subjective measure. The firm level scale developed by Moorman and Rust (1999) was adapted in this study for measuring the subjective judgments of senior management personnel. The respondents were asked to give their opinion regarding the performance of their firm itself relative to the firm's competitors. For example, one perceptual scale item for financial performance is "relative to your Company's stated objectives, how is your Company performing on costs, sales, profitability, and market share?" Another example is, "relative to your Company's stated objectives, how is your Company performing on customer satisfaction, customer retention, and product/service quality?"

The final scale for *business performance* measure consisted of 10 items listed in questions 21, 22, 23 of the survey shown in Appendix A and Appendix B. The 10 item 6-point Likert type scale was scored as 1 = *much worse*, 2 = *worse*, 3 = *somewhat worse*, 4 = *somewhat better*, 5 = *better*, and 6 = *much better*. Each questionnaire item was coded as ITBP1, ITBP2, ITBP3, ITBP4, ITBP5, ITBP6, ITBP7, ITBP8, ITBP9, and ITBP10. Respondent's scores were added, and mean score calculated for the *respect at top the management* measure, which was coded as ITBP, for each respondent using SPSS version 17 software.

$$ITBP = (ITBP1+ITBP2+ITBP3+ITBP4+ITBP5+ITBP6+ITBP7+ITBP8+ITBP9+ITBP10)/9 \qquad (10)$$

Assessment of this operationalization based on a sample of 349 cases showed an acceptable Cronbach's alpha score of 0.937.

Validity and Reliability of Measures

The preceding sections discussed and presented the operationalization of each construct of this study using question items as proxies. Together these items constituted the survey instrument shown in Appendix B. To assess and ensure instrument validity, this researcher solicited the help of an outside panel consisting of two academics, one organizational design consultant, one regional manager of healthcare service provider, one senior manager of supply chain IT, one senior director of customer operations IT, one senior manager of instructional design and development, one senior director of IT infrastructure, one VP of Applications, and one VP of customer operations IT. The panel members were asked to review the survey for readability, clarity of construct, the specificity of the items, and domain representativeness of the overall survey. Based on their inputs, some measurement items were eliminated or reworded, and others were added. This ensured content and face validity (Dillman 2000). The conceptual model was explained to these individuals, and they were asked to assess whether the survey questions were representative of the underlying constructs of the model. The questionnaire was revised to incorporate their feedback. This ensured construct validity. The resulting survey was administered to one senior director of sales, one senior director of compliance and one director of customer operations IT. They were asked to complete a survey and indicate any ambiguity or other difficulties they experienced in responding to the items. Their feedback and suggestions were used to further refine the questionnaire.

Reliability analysis was performed on all the items using SPSS version 17 software. Based on a sample of 349 cases the Cronbach's alpha coefficients of all the multi-item scales were greater than 0.70.

Data Analysis Approach

The original instrument presented in the preceding sections, and shown in Appendix B, was used to collect data online at www.zoomerang.com. Data collected by the www.zoomerang.com system was imported into SPSS AMOS 17.0 software application for analysis. The instrument and the conceptual model were tested and improved using statistical techniques suggested by Schumacker and Lomax (2004) and Byrne (1998; 2001). This ensured the validity of the instrument and the model by examining the relationships between the constructs of the conceptual model. Specifically, confirmatory factor analysis tested statistically the significance of the hypothesized model, that is, whether the sample data confirm the model (Schumacker & Lomax, 2004, p. 168). The instrument testing and model validation included several statistical steps used in SEM analysis including: (a) parameter estimation; (b) model testing using goodness of fit tests; and (c) examining the relationship amongst the constructs using standardized regression (Chin, Peterson, & Brown, 2008). Following this analysis the researcher implemented modifications to the specified model if the model's fit to the sample data was less than satisfactory as indicated by poor model fit indices (Schumacker & Lomax, 2004, p. 177).

As the first step in data analysis, using the SPSS version 17 software, Cronbach's alpha value was computed for each measurement scale in the questionnaire to evaluate the overall reliability of the survey instrument by reviewing its internal consistency (Peter, 1979; Jackson, Chow, & Leitch, 1997; Ramamurthy, Premkumar, & Crum, 1999; Hook, Ketchen, Hult, & Kacmar, 2004; Cronbach & Shavelson, 2004). Following this assessment, the confirmatory factor analysis (CFA) was performed using the AMOS software which includes statistical techniques such as (a) Chi-square test; (b) Comparative fit index (CFI); (c) Root Mean Square Error of Approximation (RMSEA). CFA was useful for isolating, and removing the indicators (survey items) with poor fit based on less than acceptable statistical parameter values thereby improving the survey instrument. The result was a final survey instrument which could be used to test the model empirically. CFA also helped to recognize multicollinearity between latent variables. Finally, the CFA analyzed and reported the relationship between the indicator variables and the hypothesized latent variables they were intended to measure. Following the assessment of the survey instrument using CFA, the structural model parameters were estimated using the maximum likelihood method.

Nature of Scale for Each Variable

The measurement scale used in this study was a 6-point Likert type scale for measuring all the major latent variables. Several items were reverse scored in order to minimize response set bias. Three types of scale anchors were used: (a) 1 = *never*, 2 = *rarely*, 3 = *somewhat occasionally*, 4 = *somewhat often*, 5 = *often*, and 6 = *extremely often*; (b) 1 = *strongly disagree*, 2 = *disagree*, 3 = *somewhat disagree*, 4 = *somewhat agree*, 5 = *agree*, and 6 = *strongly agree*; and (c) 1 = *much worse*, 2 = *worse*, 3 = *somewhat worse*, 4 = *somewhat better*, 5 = *better*, and 6 = *much better*; and reverse scale, (d) 6 = *much worse*, 5 = *worse*, 4 = *somewhat worse*, 3 = *somewhat better*, 2 = *better*, and 1 = *much better*.

Research Questions, Hypotheses, Latent Constructs – The Nomological Network

The research question "what factors shape IT department's influence and power within the firm" is supported by the theory that the latent variable constructs accountability, innovativeness, customer connectedness, and partnering with other departments are the factors positively affecting IT department's influence and power. These four latent variables were measured by several indicator variables (manifest variables). Each indicator variable was defined by one survey item. Each survey item was constructed to draw out a perception from the respondent which acted as a proxy for each indicator variable as a measure. Each latent variable was defined by one or more survey questions which are measured by a group of indicator variables. Figure 15 illustrates the connection between the research question, hypothesis statement, and the survey items in a nomological network. The construct IT department's influence and power is measured by the observable variables namely perceived power and respect at the top management level. Their manifestations are the survey items.

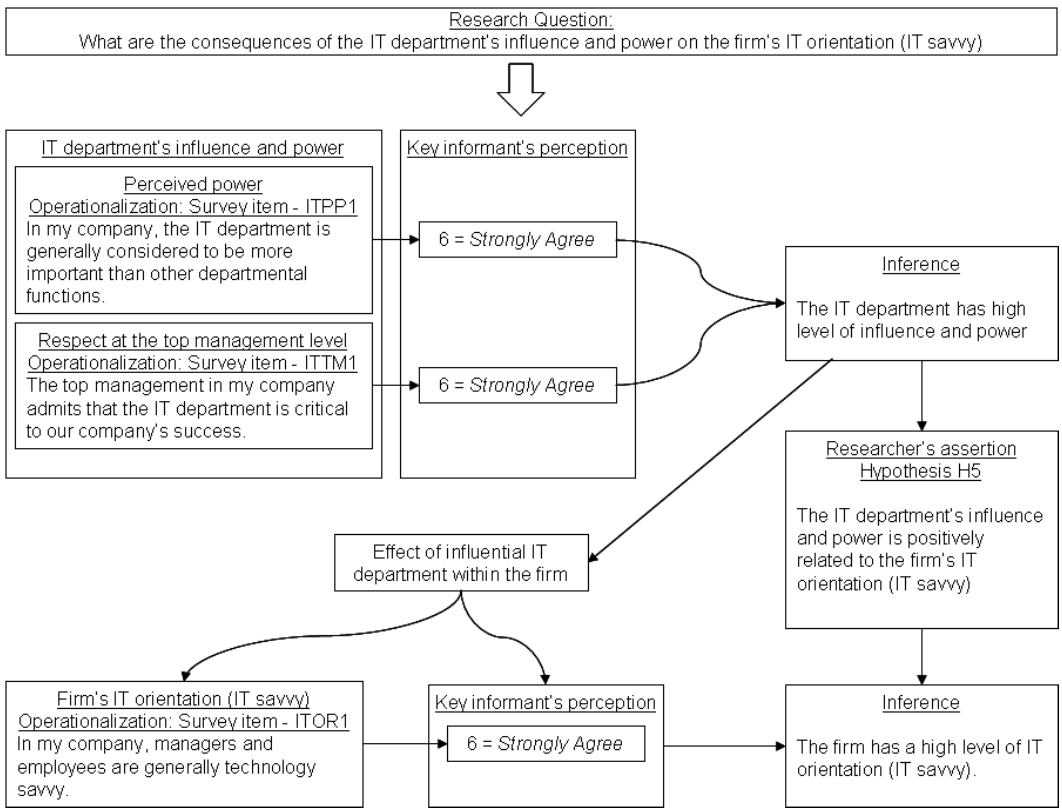

Figure 15 .Connection between research question, hypothesis, and survey items.

The connection between the research question "what are the consequences of IT department's influence and power on IT orientation," the hypothesis statement "IT department's influence and power has a positive effect on IT orientation within the firm," and the questionnaire was established by the notion that a response of *strongly agree* to the corresponding survey items "In my company the IT department is generally considered to be more important than other departmental functions," "The top management in my company admits that IT department is critical to our company's success," and "In my company, managers and employees are generally technology savvy" implies high levels of IT department's influence and power and IT orientation. Taken together, high level of IT department's influence and power has a positive effect on IT orientation. The relationships between the research questiona, the hypotheses statements, and the survey are summarized in Table 6, including the latent variable constructs tested to provide support for the research model and research questions.

Table 6

Research Questions, Hypotheses, and Survey Items – Relationship Map

Research Question	Latent Variable Construct	Hypothesis	Survey Question (number of items)
What factors shape the IT department's influence and power within the firm?	Accountability	H1: The accountability of the IT department is positively related to the influence and power of the IT department within the firm	Question 1 (6)
	Innovativeness	H2: The innovativeness of the IT department is positively related to the influence and power of the IT department within the firm.	Question 2 (6)
	Customer Connectedness	H3: The customer-connecting capability of the IT department is positively related to the influence and power of the IT department within the firm.	Question 3 (4)
	Partnering with Other Departments	H4: The partnering capability of the IT department is positively related to the influence and power of the IT department within the firm.	Question 4 (6); Question 5 (6); Question 6 (6); Question 7 (6); Question 8 (6); Question 9 (6); Question 10 (6).
What are the consequences of the IT department's influence for the firm's IT orientation (IT savvy) and the firm's business performance?	IT Department's Influence and Power; IT Orientation; Business Performance.	H5: IT department's influence and power is positively related to the firm's IT orientation. H7: The influence and power of the IT department is positively related to business performance.	Question 11 (5); Question 12 (6); Question 27 (9); Question 21 (4); Question 22 (3); Question 23 (3);
How does IT orientation (IT savvy) affect firm's business performance?	IT Orientation; Business Performance.	H6: IT orientation is positively related to business performance.	Question 27 (9); Question 21 (4). Question 22 (3); Question 23 (3).

Pilot Study

A pilot study was conducted using the survey instrument presented in this study (see Appendix B). The objective of the pilot study was three-fold. First, assess the reliability of the survey instrument. Using SPSS software the Cronbach's alpha values were computed for each of the constructs and found that they all exceeded the minimum recommended value of 0.70. Second, test whether the theory holds statistically (whether the theoretical model fits a sample data). Data collection included a survey of 325 senior managers and executives including directors and senior directors, vice presidents, and chief financial officers. Thirty nine respondents completed the surveys for a response rate of 12%. Based on the extent to which the surveys were completed, only 30 completed surveys were usable. This resulted in an effective response rate of 9%. Despite the small sample, the model showed a fit to the sample data. Although the original model showed less than recommended values of fit indices, the modified model showed significant improvement in fit indices indicating that the proposed theory was supported even for a small sample. A third objective for the pilot study was to gain knowledge of structural equation modeling and develop expertise in using the AMOS structural equation modeling software tool. Through the graphical modeling tool of AMOS, this researcher learned to develop and test measurement and structural models.

Researcher /Participant Roles and Protection of Participant Rights

This researcher was responsible for designing the survey instrument, collecting data from survey participants, analyzing the data to validate the theoretical model, and finally reporting the results of the analysis and interpretation. The Web panel of survey participants was maintained by the independent survey administrator www.zoomerang.com and was not coerced to participate. The survey instrument's first page explicitly stated that participation was voluntary. Since the Web panel was maintained by the independent survey administrator, this researcher had no knowledge of the identity of the participants and no personally identifying data were collected in the survey.

Summary

This study aimed to explore the IT department's influence and power within the firm and its linkages with accountability, innovativeness, customer connectedness, and partnerships with other departments within the firm. The instrument design and the pilot study allowed testing the reliability and validity of the survey instrument and the conceptual model was operationalized. This chapter presented an overview of the research design that was used in this study. A rationale for the choice of structural equation modeling as the statistical technique for this study was presented. The sections in this chapter provided details on population, sample data collection strategies and data analysis strategy.

In chapter 4, the data analysis, results, and interpretation—focusing on the results of the hypotheses testing and key findings—are presented.

Chapter 4: Data Analysis and Results

Introduction

This chapter describes the statistical steps used to analyze the data, and the procedures used to test the study's hypotheses. First, characteristics of the key informants to this study are described. Next, descriptive statistics of the variables and constructs are presented. Then, quality of the sample data and steps used to prepare the data for structural equation modeling (SEM) analysis are presented. Next, the SEM procedures and test steps are described. Finally, the results of the statistical tests and interpretation are presented.

Characteristics of the Key Informants

As described in chapter 3, a Web panel of 349 key informants completed the survey. Of the respondent firms, 65% (225 respondents) reported that they were publicly traded companies, of which 26% traded on the NASDAQ and 74% traded on the New York Stock Exchange; 35% (123 respondents) reported that they were privately held. The position profile of the key informants was fairly diverse: C-level executives, vice presidents, senior directors, directors, managers, and department heads (see Table 7). More than half of the respondents (59%) were senior executives. The fact that the survey respondents were experienced and senior management professionals might be an indication that the respondents were knowledgeable about their department's relationships with the IT department in their firms. Consequently, key informant bias was not a concern in this study.

Table 7

Position Profile of Key Informants to the Study

Position	Count	%
President/CEO/COO	21	6
Owner/Partner	30	9
Senior VP/VP/AVP/CIO	67	20
CFO/Finance Controller/Treasurer	27	8
Senior Director/Director	62	18
Manager/Supervisor/Department Head	78	22
Other	36	10
Not reported	25	7
Total	349	100

These firms belonged to diverse industry groups (see Table 8): financial services, banking, and insurance (32%), manufacturing (28%), retail, wholesale distribution (25%), computer, Internet, and telecommunication services (6%), and other services including health care, energy, legal (8%).

Table 8

Distribution of Key Informants to the Study by Industry Type

Industry Type	Count	Percentage
Financial Services/Banking/Insurance	111	32
Manufacturing	98	28
Retail/Wholesale Distribution	88	25
Computer/Telecommunication services	22	6
Other Services	29	8
Not reported	1	0
Total	349	100%

Of the 349 respondents, 136 (39%) were female, and 213 (61%) were male. More than half (53%) of the firms were composed of less than 5,000 employees, and 47% of the firms had more than 5,000 employees. Almost 13% of the sample was composed of very large firms with more than 50,000 employees. Large firms with more than 10,000 employees composed less than 25% of the sample. Table 9 shows the distribution.

Table 9

Number of Employees of Respondent Firms

Number of employees	Number of firms	% of firms by number of employees
Less than 100	104	30
100 – 249	22	6
250 – 499	17	5
500 – 999	14	4
1,000 – 2,499	14	4
2,500 – 4,999	14	4
5,000 – 9,999	14	4
10,000 – 14,999	8	2
15,000 – 24,999	24	7
25,000 – 34,999	14	4
35,000 – 49,999	8	2
More than 50,000	46	13
Not reported	51	15
Total	349	100

The annual sales distribution of the firms also indicates their large size (see Table 10). About 41% of the firms reported US$100 million or more in annual sales. Of the respondent firms, 31% had annual sales of less than US$ 100 million, 15% of the firms had annual sales that ranged from US$ 100 million to less than US$ 600 million, 26% of the firms had annual sales ranging between US$ 600 million to less than US$ 500 billion. Of these, about 20% of the firms reported revenue ranging from US$1 billion to less than US$100 billion, 2% of the respondents had annual sales greater than US$ 100 billion, and about 29% of the respondents did not report their sales revenue.

Table 10

Sales Revenue of Key Informant Firms during the Previous Year

Sales revenue	No. of firms	% of firms by revenue
Less than $10 million	79	23
$10M – $99M	28	8
$100M – $599M	53	15
$600M – $999	9	3
$1B – $9B	40	11
$10B – 19B	18	5
$20B – $49B	9	3
$50B – $99B	6	2
$100B – $500B	6	2
Not reported	101	29
Total	349	100

Descriptive Statistics

The means and standard deviations of the constructs are shown in Table 11. Each observation was calculated as the average of the scale items for the construct. In general, the variable means were slightly above the center of the Likert scale (i.e., 3.5) and presented a good variability. Customer connectedness (customer connecting capability of the IT department ITDC) presented the highest standard deviation (1.62). The business performance construct, however, presented the smallest standard deviation (1.11) compared to the other constructs. Since some of the variable averages were located to the right of the center of the

6-point Likert scale, there was an indication that some distributions might be skewed, and the sample data set might be non-normal.

Table 11

Composite Descriptive Statistics of the Constructs

Construct	Mean	Standard deviation
Accountability	3.71	1.54
Innovativeness	3.40	1.48
Customer Connectedness	3.10	1.62
Partnering with Other Departments	3.25	1.56
IT Department's Influence		
Perceived Power	3.16	1.50
Respect at Top Management	3.60	1.50
IT Orientation	3.42	1.40
Business Performance	3.92	1.11

Evaluation of Data Quality and Data Preparation

Before initiating the structural equation modeling steps, the quality of the sample data was reviewed, and data were organized by assessing unidimensionality and item cleaning. The 349 key informants in the Web panel were anonymous, voluntary participants. Privacy concerns constrained ascertaining more than one participant per firm. Consequently single response bias could not be entirely ruled out.

A check for common method bias was performed using Harman's one-factor test (Podsakoff & Organ, 1986). In this test, all the items were entered together into a factor analysis, and the results of the unrotated factor solution were examined. According to Podsakoff and Organ (1986), if extensive common method variance is present, one general factor would account for most of the covariance in the independent and dependent variables. In this study, all the 88 subscale items, including 58 items measuring the four antecedent variables, 11 items measuring IT department's perceived influence and power, 9 items measuring the IT orientation construct, and 10 items measuring the business performance construct, were included in a principal components factor analysis. This analysis produced ten factors, with the first factor explaining 58 percent of the variance. Moreover, no general factor was apparent in the unrotated factor solution (Scott & Bruce, 1994, p. 593).

Before conducting the SEM analyses steps utilizing the AMOS software, the data collected was evaluated for quality. This included examination of the data set for missing values and outliers, and also the normality of the data. The data set was checked for the presence of missing data. There were a few instances (0.21%) of missing data. Out of a total of 26,664 values (88 indicators X 349 sample cases), 55 values were blank (missing). A small percentage of missing data was expected given that the original questionnaire had 29 questions with over 120 scale items and several demographic items. Although substituting the missing data with the mean values of the corresponding variables could lead to under-representation of the variance of the population, the cases and variables in which the missing data occurred were random thereby minimizing the effect. Missing values were replaced using data imputation method in SPSS software.

Examination of the histograms for each variable for symmetry, as an indicator of univariate distributions, showed that many of the variables were skewed to the left (i.e., most observations fell on the right side of the scale). Although the maximum likelihood estimation requires normal data, a disadvantage of transforming the nonnormal data to achieve normality is that the new variable would no longer be a direct representation of the underlying construct. Therefore, data were not transformed. Outliers were not apparent in the box plots of all the variables corresponding to the measurement items.

Garver and Mentzer (1999) suggested that the measurement items for each of the constructs should be tested for unidimensionality, reliability and validity before testing for model fit to sample data in the measurement phase and the hypothesized relationships in the structural phase. Once unidimensionality has been established, construct validity and reliability can be investigated. Models with latent variables defined by many items "can make it difficult to produce truly unidimensional factors" (Hair, Black, Babin, & Anderson, 2010). In models composed of latent constructs with many items, SEM analysis "can be unwieldy because of likely high levels of random error in typical items and the many parameters that must be estimated" (Bagozzi & Heartherton, 1994, pp. 42-43). This was especially true in this study with most of the constructs having six or more items and a fairly complex model.

Unidimensionality is the “degree to which items represent one and only one underlying latent variable” (Garver & Mentzer, 1999, p. 35). Unidimensionality was not a concern in this study since the covariance between error terms or cross loadings were not allowed in the confirmatory factor analysis. In other words, more than one construct was not allowed to cause a single measured variable. However, in accordance with the accepted practice (Hoe, 2008; Hair et al., 2010), the scales were assessed for unidimensionality. According to Germain, Droge, & Daugherty (1994), for assessing unidimensionality, each variable construct should be separately subjected to principal components analysis in order to determine the eigenvalue. As a rule, eigenvalues greater than 1 provide support for unidimensionality (Hoe, 2008).

The principal components analysis resulted in single factor extraction, and one eigenvalue greater than 1 for the variables accountability (ITDA), innovativeness (ITDI), customer connectedness (ITDC), partnering with other departments (ITDP), IT department’s perceived power (ITPP) and business performance (ITBP) thus indicating unidimensionality. However, the principal components analysis results for the two scales, respect at the top management level (ITTM) and IT orientation (ITOR), showed two factors and eigenvalues greater than 1. Since one of the two factors explained greater than 50% of the variance, unidimensionality was inferred. Convergent validity, discriminant validity, and scale reliability were assessed in the measurement phase of the SEM process.

As most of the operationalization of the constructs in this study was adapted from prior research, the measurement items showed a high scale reliability and construct validity. However, since some of the constructs in this study were initially used in fields other than information systems research (e.g. marketing, logistics, and strategy), it was still necessary to examine the items comprising the constructs closely.

SEM Analysis

Structural equation modeling encompasses setting up and testing measurement models and structural models. A measurement model represents relationships between a set of observed variables and a set of latent variables. A structural model represents a series of recursive and non-recursive relationships between latent variables (Albright & Hun, 2008). Confirmatory factor analysis (CFA) corresponds to the measurement model of SEM (Albright & Hun, 2008).

The SEM analysis steps outlined in chapter 3 were followed and the specified models were tested using the sample data set. CFA models were estimated using the maximum likelihood method of estimation with SEM software AMOS (Arbuckle, 2008). No model identification problems were encountered. The test results were interpreted based on the criteria of goodness-of-fit measures shown in Table 5. First, the CFA of the four measurement models was performed. Next, measurement models were coupled in structural relations according to the theory presented in chapter 1 and chapter 2, and the structural model was tested. The following sections present the SEM analysis procedures performed and the results of testing.

Measurement (CFA) Models

As stated in chapter 3, the theoretical model in this study was decomposed into four measurement models consisting of four major latent construct groups: (a) antecedent variables construct made up of four latent (unobserved) factors namely accountability, innovativeness, customer connectedness, and partnering with other departments; (b) the IT department's influence and power construct; (c) the firm's IT orientation construct; and (d) the firm's business performance construct. The scores on the survey instrument from the 349 samples were analyzed to see how each measure loaded on the latent variables and measured the constructs they were designed to measure. The structural model, on the contrary, specified how these latent variables influenced one another directly or indirectly to change their values (Byrne, 2001) "incorporating the specified measurement error variances" (Smith, & Langfield-Smith, 2004, p. 54). Finally, the overall model, optimized for most significant paths was tested for its goodness of fit with the sample data. Table 5 shows the commonly used fit indices in SEM analysis for the assessment of model fit. The chi-square value is large when (a) the sample size is large, and (b) number of observed variables in the model is large making it more difficult to achieve a good model fit (Byrne, 2001; Hair et al., 2010; Ho, 2006). The "statistical test or the resulting *p*-value is less meaningful as sample sizes become large or the number of observed variables become large" (Hair et al., 2010, p. 648). For this reason, instead of using it solely as a measure of goodness of fit, the Chi-square statistic is complemented with other goodness of fit measures listed in Table 5 (Hair et al., 2010; Ho, 2006).

As stated previously, all models were tested using SPSS statistics software and the AMOS Graphics SEM modeling software both version 17. The AMOS graphics software allowed depicting the statistical relationships in a pictorial form with latent variables represented by elliptical shapes and observed variables by rectangles. The relationships between the variables are depicted by arrows, with each single headed arrow representing a regression equation, and each two headed arrow representing a correlation.

Measurement model 1 – antecedent variables construct. The first measurement model, Measurement Model 1, consisted of the following components and is shown in Figure 16.

1. There are four antecedent variable factors as indicated by the four ellipses labeled ITDA (accountability), ITDI (innovativeness), ITDC (customer connectedness), and ITDP (partnering with other departments).
2. The four factors are intercorrelated, as indicated by the two-headed arrows.
3. There are 58 observed variables as indicated by the 58 rectangles (ITDA1-ITDA6, ITDI1-ITDI6, ITDC1-ITDC4, and ITDP11-ITDP76) and they represent item-pairs from the *accountability, innovativeness,*

customer connectedness, and partnering with other departments subscales of the survey (see Appendix A).

4. The observed variables load on the factors in the following pattern: ITDA1-ITDA6 load on Factor 1; ITDI1-ITDI6 load on Factor 2, ITDC1-ITDC4 load on Factor 3; and ITDP11-ITDP76 load on Factor 4.
5. Each observed variable loads on one and only one factor.
6. Errors of measurement associated with each observed variable (e1-e58) are uncorrelated.

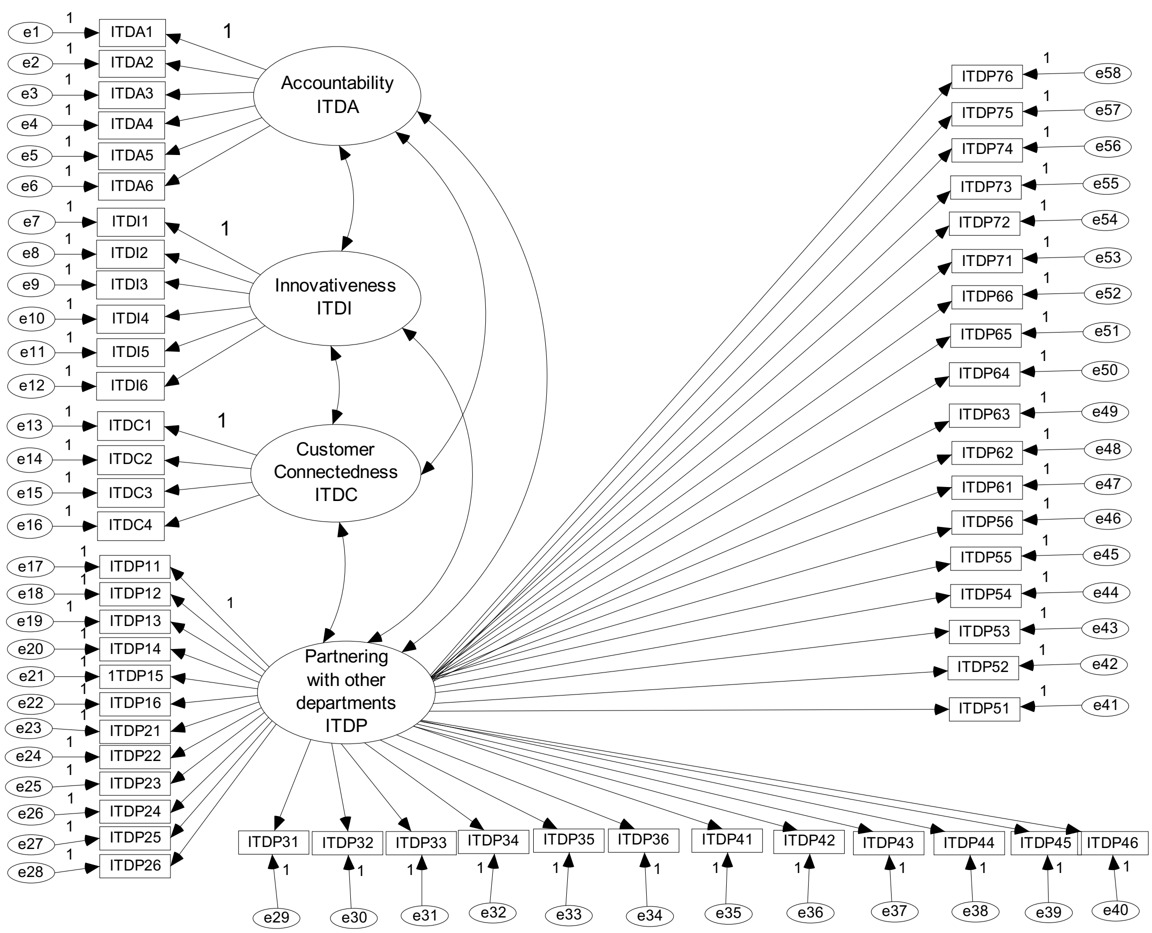

Figure 16 Measurement model 1: Antecedent variables

A working definition of each construct is presented in chapter 1. Reflective measurement theory was assumed in the CFA. This is based on the idea that the (a) latent constructs cause the measured variables and (b) the measurement error results in an inability to fully explain these measures. For example, *accountability* causes specific measured indicators such as how effective the IT department in a firm is at linking its activities to financial outcomes, how often the IT department shows the financial outcomes of its plans.

The following is a formal description of the hypothesized model. As such, this researcher asserted before testing the model that the model presented in Figure 16 hypothesized *a priori* that the model is correct and fits the sample data at a probability level of $p < .05$. Furthermore, the following statements were posited prior to testing the model:

1. The antecedents of IT department's influence within a firm can be explained by four factors: ITDA (accountability), ITDI (innovativeness), ITDC (customer connectedness), and ITDP (partnering with other departments).
2. Each item-pair measure has nonzero loading on the IT Department's Influence factor that it was designed to measure (target loading), and a zero loading on all other factors (non-target loading).
3. The four IT Department's Influence factors are correlated. This is consistent with the theoretical underpinnings identified in the literature review.
4. Errors (uniquenesses) associated with each measure are uncorrelated.

Confirmatory factor analysis and model assessment. The input covariance matrix generated by AMOS software from the model's 58 measurement variables contained 1711 distinct sample moments. For the measurement model, there were 54 regression weights, 6 covariances, and 62 variances for a total of 122 parameters to be estimated. The model, therefore, had 1589 degrees of freedom (1711 – 122), and the Chi-square goodness-of-fit was computed (see Table 12). The Chi-square goodness-of-fit test showed that the model did not fit the sample data well.

The incremental fit indices of NFI, RFI, IFI, and CFI used for baseline comparisons (see Table 12) were 0.70, 0.68, 0.73, and 0.73 respectively indicating that the model was only 68% to 73% of a very good fit. For adequate fit, the SEM literature recommends a range of 0.89 to 0.94 for these fit indices (Ho, 2006). This indicated that there was a significant amount of possible improvement in fit remained to be analyzed for the measurement model 1.

Table 12

CFA Model 1 – Antecedent Variables: Goodness-Of-Fit Statistics

Index	Shorthand	Values for the measurement model with 58 indicators
Chi-Square	χ^2	11640.15 (p< 0.001)
Degrees of freedom	Df	1589
Normed Chi-Square	χ^2/df	7.33
Goodness of Fit Index	GFI	0.40
Standardized root mean squared residual	SRMR	0.04
Root mean square error of approximation	RMSEA	0.13
90% confidence interval for RMSEA		(0.13; 0.14)
Normed Fit Index	NFI	0.70
Relative Fit Index	RFI	0.68
Incremental Fit Index	IFI	0.73
Comparative Fit Index	CFI	0.73

The four-factor, 58-item model, as depicted in Figure 21, yielded a χ^2 value of 11640.15 with 1589 degrees of freedom and a probability of less than .001 (p<.001). This significant value of χ^2 suggested that, with the given data of

349 sample cases, the hypotheses as summarized by the model, occur less than one in a thousand under the null hypothesis, and should be rejected.

Notwithstanding the fact that the present model in this study did not fit the data based on χ^2 test alone, studying the parameter estimates was not without merit in order to find out if the hypothesized model could be modified for a better fit to the sample data. Therefore, the path coefficients were examined to determine if there was strength in the relationships between the constructs. Unstandardized and standardized correlational path coefficients were in the hypothesized direction (i.e., positive, no negative values), and had significance above the critical ratio (*t*-value) of $\pm$ 1.96 for a Type I error of 0.05. SEM literature (e.g. Hair et al) suggested that a standardized path coefficient value exceeding |1.0| was an indicator of problems relating to (a) model identification, (b) data issues, and (c) poorly specified constructs. Examination of the data and the CFA output for the four factor measurement models showed no standardized path coefficient value violating this condition. The CFA output provided by the AMOS software included standardized residuals, which could be either positive or negative. SEM literature suggested that a consistent pattern of large standardized residuals greater than |4.0| associated either with a single variable and a number of other variables or residuals for several of the variables within a construct raised a red flag and suggested a potentially unacceptable degree of error. For the hypothesized CFA model, there were no residuals meeting these criteria, and neither model identification nor poor construct or data issues were evident. Consequently, guided by SEM literature and the modification indices values computed by AMOS software, a systematic model modification approach was implemented in this study and is discussed in the next section.

At this point, the conclusion was that the confirmatory factor analysis indicated discrepancies in the overall model fit and, therefore, from a strictly confirmatory evaluation perspective, the model fails, and any subsequent analysis must be viewed as exploratory. According to Byrne (2001) when a researcher elects to modify and re-estimate a model, the analysis must be framed within an exploratory, rather than a confirmatory mode (p. 91). In other words, the rejection of the hypothesized CFA model 1 in the preceding analysis spelled the "end of confirmatory factor analytic approach, in its truest sense" (Byrne, 2001, p. 91) in this study. Nevertheless, the CFA procedures were used in the modification process and re-estimation of model 1. The focus of the post hoc analysis was on the detection of parameters that did not fit in the originally hypothesized Model 1. Also, the purpose of the model modification was primarily to verify that the four-factor model concept was theoretically valid. Byrne (2001) recommended that indicators producing nonsignificant parameters should be deleted from the model.

Measurement model modification approaches. Two approaches were considered for improving the measurement model fit. First, the model diagnostics provided by AMOS software output was reviewed to determine how the model could be improved further or whether there was a problem area not yet revealed. Second, contemporary SEM literature was consulted (e.g., Dow, Wong, Jackson, Leitch, 2008; Yang, Nay, & Hoyle, 2010), and it was found that researchers successfully used item scale shortening to improve CFA performance for assessing model fit.

Diagnostics. The following diagnostics from the AMOS software CFA output were checked: path estimates, standardized residuals, and modification indices.

Path estimates. Evaluation of loadings of each indicator on a construct provided evidence to identify the indicators that may be candidates for elimination. Loading below 0.7 was determined as the threshold for item deletion. The decision to eliminate indicators was not entirely based on the loadings, but also on the other diagnostic measures including the standardized residuals and modification indices. However, items were not targeted for deletion since an examination of the AMOS software output for model 1 showed all loadings exceeded the threshold.

Standardized residuals. Another criterion for item elimination is the standardized residuals exceeding |2.5|. AMOS output showed no evidence of violating this threshold. Therefore, item deletion was not implemented based on these criteria.

Modification indices. AMOS software computes two types of modification indices (MI) for all the possible parameters that were not estimated in the model (i.e., the fixed parameters). One is the MI for the covariance of the error terms, and the second is the MI for the factor loadings. Items associated with modification index value greater than 10 were singled out for deletion.

Scale shortening. The process of shortening survey measurement scales is not new (Moore, Halle, Vandivere, & Marina, 2002). From a construct's lengthy scale with a large number of indicators, a few indicators with certain content and predictive validity may be selected to yield a shortened scale (Moore, Halle, Vandivere, & Marina, 2002), which can be incorporated into SEM. According to McDonald (1996) an underlying construct could have an infinite number of indicators. Therefore, a shortened scale could be considered as a smaller sample of a large group of indicators (Yang, Nay, & Hoyle, 2010). Moore, Halle, Vandivere, and Marina (2002) found that a 6-item scale selected from 28 items with empirical data was equivalent to the full 28-item scale. Based on this finding, Yang, Nay, and Hoyle (2010) argued that it is not necessary for researchers to be too alarmed that the shortened scale may not be proportionate with its parent in its content validity, because neither the large parent scale nor the shortened child scale is a perfect measure. According to Little, Lindenberger, and Nesselroade (1999) when the research domain is specified reasonably well such that the researcher can deliberately select the key informants (rather than a random sample), a small number of indicators may suffice to identify the construct precisely. In such situations, a large number of indicators are not necessary, and one can trade off variables (Little, Lindenberger, & Nesselroade, 1999; Yang, Nay, & Hoyle, 2010).

Based on the preceding discussion, literature supported shortening the scales in this study. One issue was the criteria for determining the minimum number of indicators. Little, Lindenberger, and Nesselroade (1999) advocated that shortening a larger scale to less than four items might weaken its content validity, although its predictive validity could be retained. Hair, Black, Babin, and Anderson (2010) suggested a "three-indicator rule" (p. 682) considering that if all the factors have a minimum of three significant indicators, model identification would be satisfied. Therefore, in the current analysis, shortening the scales to three to six items appeared reasonable. Another issue, however, was which strategies to apply to reduce the scale length. Moore et al. (2002) suggested using the magnitude of the correlations between the endogenous and exogenous construct indicators, while Bollen and Lennox (1991) recommended using the magnitude of factor loadings.

Modified measurement model 1. Indicators (scale items) were eliminated in an iterative process based on the modification index and scale shortening criteria discussed in the preceding sections (see sections Modification indices, and Scale shortening). The largest modification index item was deleted one at a time, and the CFA output from AMOS software was generated and reviewed after each deletion before a subsequent deletion was implemented. During this iterative process, in order to ascertain the significance or nonsignificance of parameters, the magnitude of the modification indices values together with the R^2 values less than 0.5 were also reviewed to identify indicators for elimination. The rationale was that the R-sq value of 0.5 or better explained 50% or more of the variation in the unobserved variable and, therefore, a useful and significant parameter. The result of this modification procedure was the modified model 1 shown in Figure 17. This model was specified and model parameters estimated using the AMOS software.

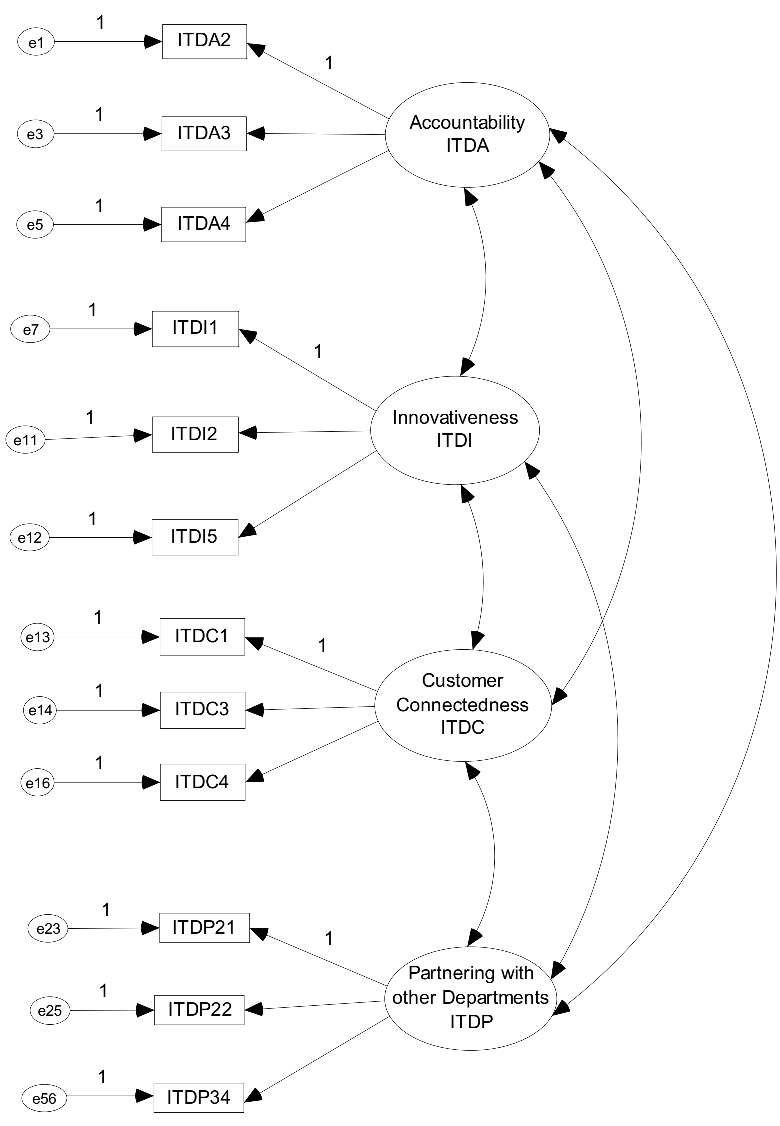

Figure 17 .CFA model 1 - Measurement theory model for the antecedent constructs

The input covariance matrix generated by AMOS software from the modified measurement model's 12 measurement variables contained 78 distinct sample moments. For this measurement model, there were 8 regression weights, 6 covariances, and 16 variances, for a total of 30 parameters to be estimated. The model, therefore, had 48 degrees of freedom (78-30 = 48), and AMOS software computed the chi-square goodness-of-fit statistic (see Table 13).

Table 13

CFA Model 1 Comparison of Goodness-Of-Fit Measures - Initial Model and Modified Model

Index	Shorthand	Initial model with 53 indicators (N = 349)	Modified model with 12 indicators (N = 349)
Chi-Square	χ^2	11640.15 ($p < 0.001$)	119.47 ($p < 0.001$)
Degrees of freedom	Df	1589	48
Normed Chi-square	χ^2/df	7.33	2.49
Goodness of fit index	GFI	0.40	0.94
Standardized root mean squared residual	SRMR	0.04	0.02
Root mean square error of approximation	RMSEA	0.13	0.07
90% interval for RMSEA		(0.13; 0.14)	(0.05; 0.08)
Normed fit index	NFI	0.70	0.97
Relative fit index	RFI	0.68	0.96
Incremental fit index	IFI	0.73	0.98
Comparative fit index	CFI	0.73	0.98

The chi-square statistic, which is the absolute fit statistic, did not indicate that the observed covariance matrix was equivalent to the estimated covariance matrix within the sampling variance. The value for the root mean square error of approximation (RMSEA), another absolute fit index, was 0.07. This value is below the 0.08 guideline for acceptance of good fit (Hair et. al., 2010; Ho, 2006). The true value of RMSEA was between 0.07 and 0.08, using the 90% confidence interval. Thus, even the upper bound of RMSEA met the guideline and provided additional support for model fit. The third absolute fit statistic is the normed chi-square which was 2.49. This measure is the chi-square divided by the degrees of freedom. A number between 2.0 and 5.0 is considered acceptable (Hair et. at., 2010; Ho, 2006). Thus, the normed chi-square suggested an acceptable fit for the modified CFA model.

Although the modified measurement model did not fit the observed variance-covariance matrix well by the chi-square test alone, the fit was acceptable based on two other absolute fit indices namely normed Chi-square and RMSEA. Additionally, the baseline comparison incremental fit indices of NFI, RFI, IFI, and CFI were all above 0.9 (range: 0.94 to 0.98). With the incremental fit indices ranging from 0.94 to 0.98, any further improvement in the fit of the modified measurement model to sample data was small enough (range: 0.02 to 0.06) to be of little practical significance. The modified four-factor antecedent measurement model provided a good fit. The parameter estimates were further examined to assess the issues relating to construct validity.

Convergent validity, construct reliability, scale reliability, and discriminant validity were examined next in order to evaluate the validity of the constructs. Face validity was established, as noted in chapter 3, section *Validity and Reliability of Measure*s, through a pilot study, based on the content of the corresponding items.

Convergent Validity. Convergent validity denotes the extent to which the items of the factor represent the construct's content. In this study, convergent validity was assessed using two methods. The first method was the assessment of the factor loadings for positive, and statistically significant (0.7 or higher) values (Hofer & Knemeyer, 2009). The factor loadings were computed by AMOS software using the measurement equations which represented all the variables as a function of the factor (Hofer & Knemeyer). The second method was the assessment of the average variance extracted (AVE) by the construct for values greater than 0.5 (Garver & Mentzer, 1999). AMOS software output data were used to check the convergent validity by both methods. It was noted that only the loading of the variable ITDC1 was 0.63 all other loadings were positive and statistically significant. It was thus inferred that convergent validity existed. The AVE corresponds to the mean squared standardized loading. Using the values of standardized loadings computed by AMOS software, AVE was calculated for all constructs by the formula (11):

$$AVE = \sum_{i=0}^{n} \frac{L_i^2}{n} \tag{11}$$

The L_i represents the standardized factor loading, and *i* is the number of items (indicators). For *n* items, AVE is calculated as the sum of all squared standardized factor loadings (AMOS software calls this squared multiple correlations) divided by the number of items. The average variance extracted (AVE) values were computed for each latent antecedent variable construct, *accountability*, *innovativeness*, *customer connectedness* and *partnering with other departments*. The AVE values ranged from 0.68 to 0.82 (see Table 14), much higher than 0.50 as suggested by Garver and Mentzer (1999). This indicated that each factor explained greater than 50% of the variation in the corresponding item, and that the error variation was small (less error remains in the items) which was indicative of the items adequately representing the construct.

Table 14

Variance Extracted

Construct	Average variance (AVE)
Accountability	0.76
Innovativeness	0.83
Customer Connectedness	0.68
Partnering with Other Departments	0.82

Discriminant Validity. Examination of the discriminant validity of the constructs was another test conducted in the measurement phase. The test is the verification of the item loadings. It confirms whether or not the items load on the construct of interest. According to several authors (Shook et al 2005; Kline 2005), achieving a good fit for the model in which "each indicator loads on only one factor provides a precise test of convergent and discriminant validity" (Kline, 2005, p. 182). The modified four factor 12-inidcator antecedent variables model presented good fit indices values (GFI=0.94, NFI=0.97, RFI=0.96, IFI=0.98, CFI=0.98); thus it was inferred that discriminant validity existed.

Scale Reliability. According to Garver and Mentzer (1999) scale reliability conveys the internal consistency of a particular scale used to measure a latent variable. It is an indicator of whether a factor is expected to be stable and replicable. Garver and Mentzer (1999) contend that the coefficient alpha (Cronbach's alpha), the traditionally adopted measure of reliability, has few limitations. When the construct has a large number of items, in some cases, it tends to underestimate the scale reliability or become inflated. Garver and Mentzer (1999) suggested that SEM reliability measures, such as the average variance extracted and the "Construct Reliability" (Hair et. al., 2010) were better, alternative measures of scale reliability. In this study, both methods were used to ascertain the scale reliability. The average variance extracted (AVE) value was calculated (Table 11), and all the constructs had values above 0.5 as recommended by Garver and Mentzer (1999). In addition, the construct reliability (CR) was calculated from the squared sum of factor loadings (L_i) for each construct and the sum of the error variance terms for a construct (e_i) as:

$$CR = \frac{\left(\sum_{i=1}^{n} L_i\right)^2}{\left(\sum_{i=1}^{n} L_i\right)^2 + \left(\sum_{i=1}^{n} e_i\right)} \qquad (12)$$

According to Hair et al (2010) a CR estimate of 0.7 or greater suggests good reliability. Reliability between 0.6 and 0.7 is acceptable. CR values for the modified measurement model were found to be 0.68 to 0.87 (see Table 14) confirming internal consistency was present, meaning that all the measures consistently represented the same latent construct. Taken together, the factor loadings, AVE, CR, and alpha values indicated that convergent validity, construct and scale reliability existed. Table 15 shows the results.

Table 15

Construct Reliability

Construct	Construct reliability (CR)	Cronbach's alpha	Average variance (AVE)	Number of items
Accountability	0.80	0.90	0.76	3
Innovativeness	0.87	0.93	0.83	3
Customer Connectedness	0.69	0.85	0.68	3
Partnering with Other Departments	0.86	0.93	0.82	3

Next, the strength of the path coefficients was examined to ascertain that the loadings were significant in support of the theoretical assertions regarding what constituted each construct. Figure 18 shows the factor loading for each path (single-headed arrow) from the latent construct to the indicator variable. The AMOS software output calls the factor loadings as “standardized regression weights.” The standardized regression coefficients (weights) are also called the beta (β) coefficient values. The higher the β value the better the loading and the better they contribute to explaining the construct. For example, a β higher than 0.5 means that the item explains greater than 50% of the variation in the latent variable.

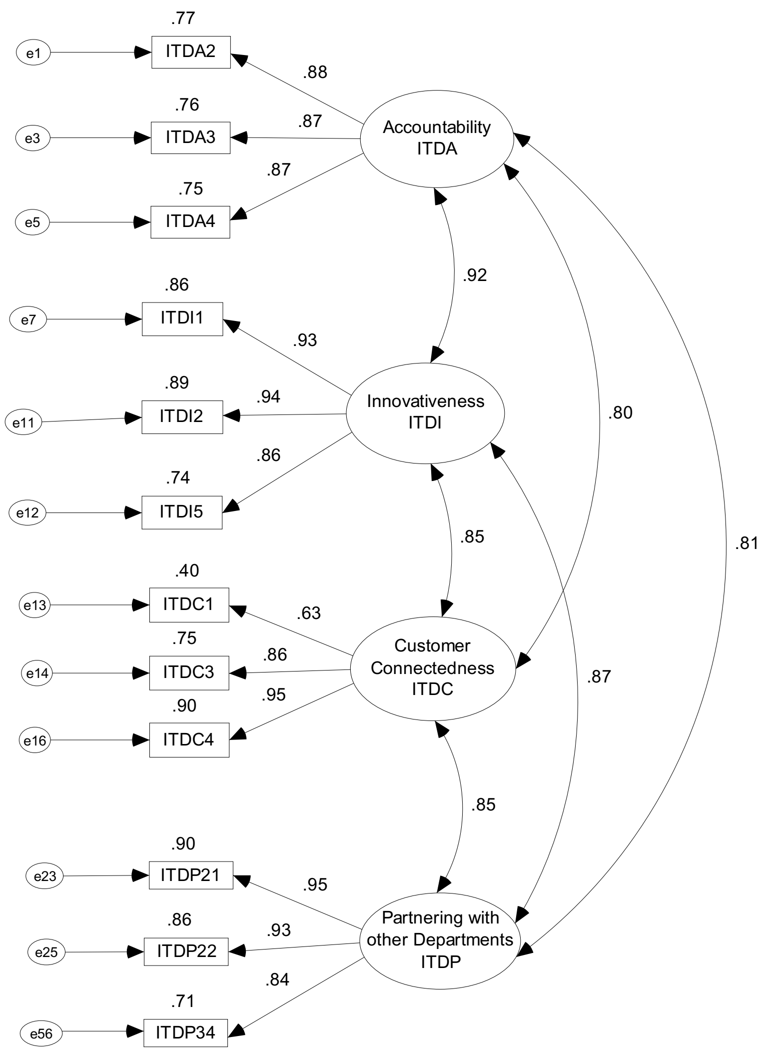

Figure 18 . Measurement model 1antent variables: Standardized factor loadings β.

The strength of the path coefficient parameters estimated for the antecedent variable *accountability* indicated that the accountability of the IT department is defined by a demonstration of information sharing regarding the financial outcomes of IT department's activities (ITDA2: $\beta = 0.88$), periodically checking up on itself (self audit) on its own effectiveness (ITDA3: $\beta = 0.87$), and by providing high quality service to the internal user community (ITDA4: $\beta = 0.87$). The strength of the path coefficient parameters estimated for the antecedent variable *innovativeness* indicated that the innovativeness of the IT department is defined by the employees of the firm perceiving the IT department as a creative department (ITDI1: $\beta = 0.93$), the perception that the IT department offers new ideas on how to improve business processes by using the information technologies (ITDI2: $\beta = 0.94$) and the perception that the IT department tries out new information technologies (ITDI5: $\beta = 0.86$). Similarly, based on the factor loadings on the *customer connectedness* construct, the customer connecting capability of the IT department is defined by the indication that the customers of the firm routinely contact the IT department (ITDC1: $\beta = 0.63$), that the IT department is routinely consulted by other departments regarding customers' needs (ITDC3: $\beta = 0.86$) and that the IT department knows how to take care of customers' needs (ITDC4: $\beta = 0.95$). Finally, based on the factor loadings on *partnering with other departments* construct, the partnering capability is defined by sharing of ideas (ITDP21: $\beta = 0.95$, and ITDP22: $\beta = 0.93$) and working together as a team (ITDP34: $\beta = 0.84$). Following the CFA procedure in the preceding analysis for the four factor antecedent variables measurement model, the three remaining measurement models were analyzed: the *IT department's influence and power* construct; the firm's *IT orientation* construct; and the firm's *business performance* construct. These models were defined and identified in AMOS software. To calculate the parameter estimates, the AMOS program was executed on each model. Results were reviewed for adequacy of model fit to sample data, and models were modified to achieve a better fit. The following sections present the CFA of these three measurement models and the results.

Measurement model 2- IT department's influence and power construct. Figure 19 depicts the 11-item single factor latent variable model tested for the IT department's influence and power construct.

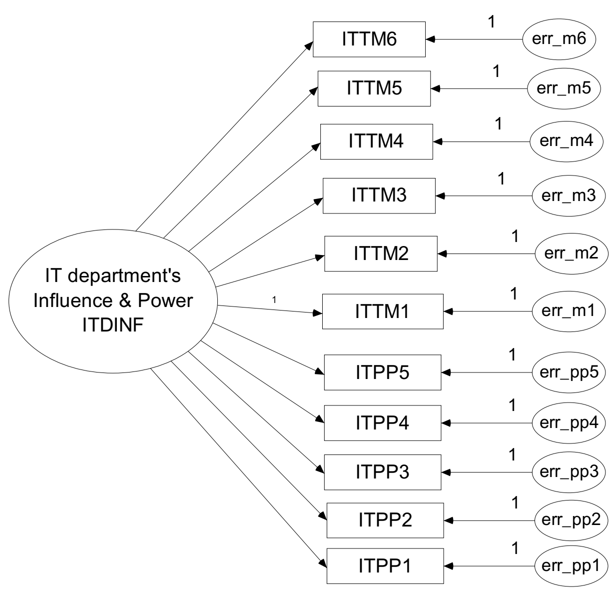

Figure 19 .CFA model IT department's Influence.

Note. ITTM = Respect at the top management level or top management respect; ITPP = Perceived power.

The model consists of the following parts:

1. There is one IT department's influence factor as indicated by the ellipse labeled ITDINF (IT department's influence and power).
2. There are 11 observed variables as indicated by the 11 rectangles (ITTM1-ITTM5, ITDP1-ITDP6) and they represent item-pairs from the *top management respect* and *perceived power* subscales of the survey (Appendix A).
3. The observed variables load on the ITDINF factor.
4. Errors of measurement associated with each observed variable are uncorrelated.

The measurement model 2 was not a good fit to the data. As seen from Table 16, the goodness of fit indices were less than recommended values of 0.9 for acceptable fit (range: 0.51 to 0.63). Following the preceding procedure used in the modification of model 1, including the AMOS modification indices, model 2 was modified to improve the fit. Results of the final modified model are shown in Table 16.

Table 16

CFA Model 2 IT Department's Influence and Power – Comparison of Goodness-Of-Fit Indices - Initial Model and the Modified Model

Index	Shorthand	Initial model with 11 indicators (N = 349)	Modified model with 4 indicators (N = 349)
Chi-Square	χ^2	1473.65 (p< 0.001)	1.31 (p = 0.52)
Degrees of freedom	Df	44	2
Normed Chi-Square	χ^2/df	33.49	0.65
Goodness of Fit Index	GFI	0.51	1.00
Standardized root mean squared residual	SRMR	0.14	0.004
Root mean square error of approximation 90% interval for RMSEA	RMSEA	0.31 (0.29; 0.32)	0.00 (0.00; 0.09)
Normed Fit Index	NFI	0.62	1.00
Relative Fit Index	RFI	0.53	1.00
Incremental Fit Index	IFI	0.63	1.00
Comparative Fit Index	CFI	0.63	1.00

The input covariance matrix generated from the modified model's four observed variables contains 10 distinct sample moments. For the model, there are three regression weights and five variances, for a total of eight parameters to be estimated. The model has positive degrees of freedom (10 – 8 = 2), and the Chi-square goodness of fit statistic was computed by the AMOS software. The Chi-square value of 1.31 is relatively small, the corresponding *p* value ($p = 0.52$) is relatively large based on the conventional 95% level indicating no statistically significant difference between observed sample, and the estimated covariance matrix for the model. This supports the idea that, the theory that, the four indicators (see Figure 20) define the IT department's influence and power construct fits reality.

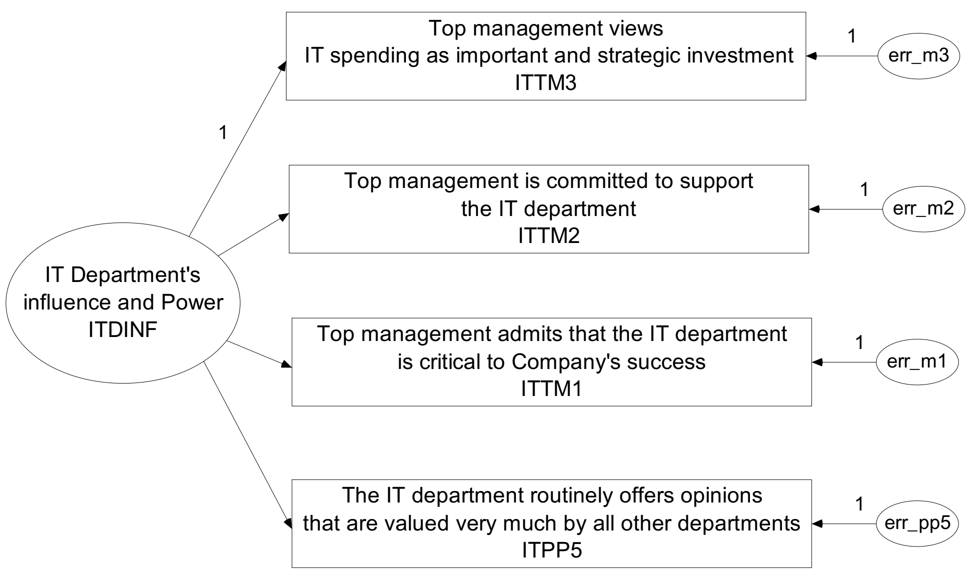

Figure 20 .Four-indicator model of IT department's influence & power construct.

Note. ITTM = Respect at the top management level; ITPP = Perceived power

The modified four indicator model (see Figure 20) achieved good fit based on the fit indices NFI, RFI, IFI, and CFI exceeding 0.9, the criteria for acceptable fit. The standardized root mean square residual (SRMR) value of 0.004 and the RMSEA of 0.00, both calculated by AMOS software, indicated that this four indicator model would describe the population covariance matrix, if it were available, reasonably well (Brown & Cudeck, 1993, p. 137).

The CFA results suggested that the modified model 2 for the IT department's influence and power construct provided a good fit. The parameter estimates were further examined to assess the issues relating to construct validity. Face validity was established, as noted in chapter 3, section *Validity and Reliability of Measure*s, through a pilot study, based on the content of the corresponding items. Convergent validity, construct reliability, and scale reliability were computed next in order to evaluate the validity of the construct.

First, the factor loadings for the four indicator paths were examined and found to be positive and statistically significant (see Figure 21). Next, the AVE was computed for the construct and was found to be greater than the desired 0.50 threshold as suggested by Garver and Mentzer (1999). Then Cronbach's alpha value was computed for the four items that load on the construct and the composite score was greater than the desired 0.7. Finally, the construct reliability (CR) value was computed and found to be greater than 0.7 suggesting good reliability (Hair et al., 2010, p. 687). Taken together, the factor loadings of the four scale items (see Figure 21), AVE (0.79), CR (0.87), and alpha (0.93) values indicated that convergent validity, construct and scale reliability existed.

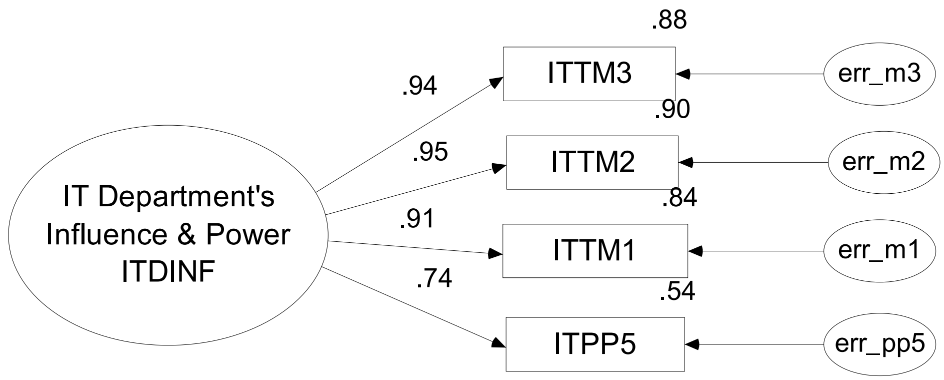

Figure 21 .Factor loadings - IT department's influence and power.

Note. ITTM = Respect at the top management level; ITPP = Perceived Power

The strength of the path coefficient parameters estimated for the indicator ITPP5 variable (β = 0.74) implies, the degree to which the IT department’s opinions are valued defines the IT department’s perceived power within the firm. The parameter estimates for the three indicator variables ITTM1 (β = 0.91), ITTM2 (β = 095), and ITTM3 (β = 0.94) indicate that the IT department’s influence and power depends on what the top management of the firm thinks about the IT department. Taken together, the results indicate that, the theory that the IT department’s influence and power construct is defined by these four indicators reasonably well fits reality.

Measurement Model 3 – IT Orientation Construct. Figure 22 depicts the 9-item single factor latent variable model for the IT orientation construct.

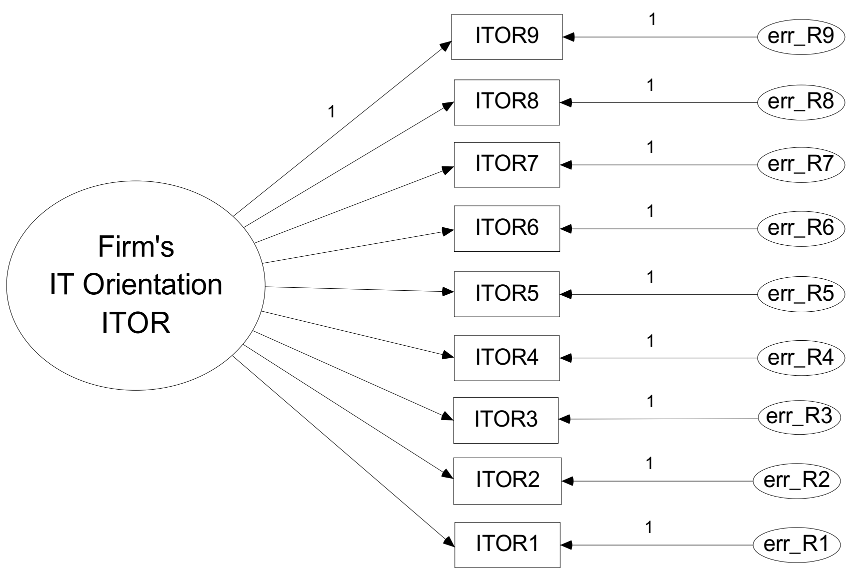

Figure 22 Model 3 - IT Orientation Construct.

The model consists of the following parts:

1. There is one IT Orientation factor as indicated by the ellipse labeled ITOR.
2. There are 9 observed variables as indicated by the 9 rectangles (ITOR1-ITOR9) and they represent item subscales of the survey (Appendix A).
3. The observed variables load on the ITOR factor.
4. Errors of measurement associated with each observed variable are uncorrelated.

The measurement model 3 was not a good fit to the sample data. As seen from Table 17, the goodness of fit indices were less than recommended values of 0.9 for acceptable fit (range: 0.726 to 0.809). Following the preceding procedure used in the modification of model 1, including the AMOS modification indices, five non-significant indicators were dropped from model 3 resulting in a four indicator model (see Figure 23) with improved fit (see Table 17).

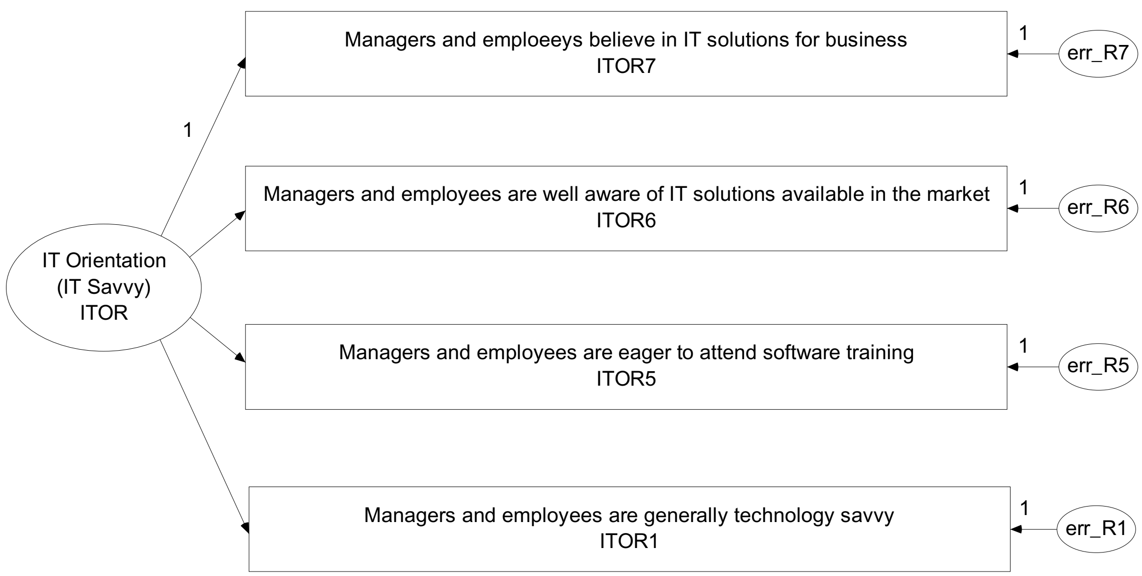

Figure 23 .IT orientation construct (modified model).

Table 17

CFA Model 3 – IT Orientation: Comparison of Goodness-Of-Fit Measures

Index	Shorthand	Initial CFA model with 9 indicators (N = 349)	Modified CFA model with 4 indicators (N = 349)
Chi-Square	χ^2	416.29 (p< 0.001)	13.45 (p< 0.001)
Degrees of freedom	df	27	2
Normed Chi-Square	χ^2/df	15.42	6.72
Goodness of Fit Index	GFI	0.78	0.98
Standardized root mean squared residual	SRMR	0.13	0.02
Root mean square error of approximation	RMSEA	0.20	0.13
90% interval for RMSEA		(0.19; 0.22)	(0.07; 0.20)
Normed Fit Index	NFI	0.79	0.98
Relative Fit Index	RFI	0.72	0.95
Incremental Fit Index	IFI	0.80	0.99
Comparative Fit Index	CFI	0.80	0.99

Although the modified model failed to fit the data by the Chi-square test alone, the modified four indicator model (see Table 17) achieved good fit based on the fit indices NFI, RFI, IFI, and CFI exceeding 0.9, the criteria for acceptable fit. The standardized root mean square residual (SRMR) value of 0.02, and the RMSEA value falling in the range of 0.07 to 0.20, both calculated by AMOS software, indicated that the four indicator model described the population covariance matrix, if it were available, reasonably well (Brown & Cudeck, 1993, p. 137).

The CFA results suggested that the modified four indicator measurement model of the IT Orientation (IT savvy) construct provided a good fit to sample data. The parameter estimates were examined next in order to assess the issues relating to construct validity. Face validity was established, as noted in chapter 3, section *Validity and Reliability of Measure*s, through a pilot study, based on the content of the corresponding items. Convergent validity, construct reliability, and scale reliability were examined in order to evaluate the validity of the IT orientation construct.

First, the factor loadings for the four indicator paths were examined and found to be positive and statistically significant (Figure 24). Next, the average variance extracted was computed for the construct and was found to be greater than the desired 0.50 threshold (see Table 19). The Cronbach's alpha value was computed for the four items that load on construct and the composite score was greater than the desired 0.7. The construct reliability value was computed and found to be greater than 0.7 suggesting good reliability (Hair et al., 2010, p. 687). Taken together, the factor loadings of the four scale items (see Figure 24), AVE (0.70), CR (0.84), and alpha (0.90) values indicated that convergent validity, construct and scale reliability existed.

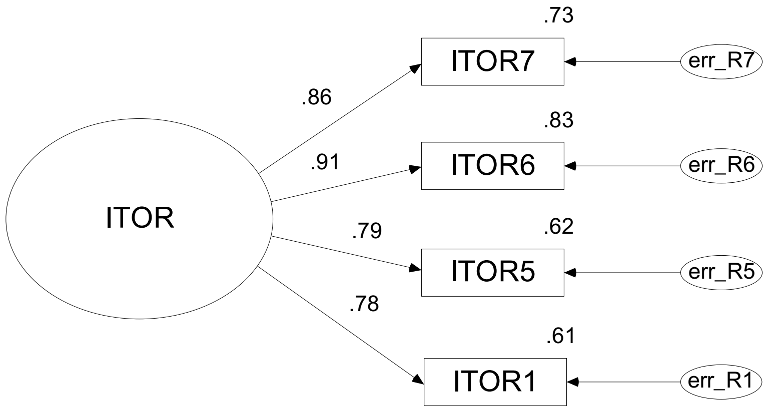

Figure 24 .Factor loadings for IT orientation construct.

Next, the average variance extracted was computed for the construct and was found to be greater than the desired 0.50 threshold (see Table 19). The Cronbach's alpha value was computed for the four items that load on construct and the composite score was greater than the desired 0.7. The construct reliability value was computed and found to be greater than 0.7 suggesting good reliability (Hair et al., 2010, p. 687). Taken together, the factor loadings of the four scale items (see Figure 24), AVE (0.70), CR (0.84), and alpha (0.90) values indicated that convergent validity, construct and scale reliability existed.

The strength of the path coefficient parameters estimated for four indicator variables ITOR1 (β = 0.78), ITOR5 (β = 0.79), ITOR6 (β = 0.91), and ITOR7 (β = 0.86) indicated that the theory, that the IT orientation (IT savvy) of the firm is defined by the employees' awareness of the types of information technologies available for exploitation, employees' belief that information technologies can help business, and employees' willingness to learn new information technologies, fits reality.

Measurement Model 4 – Firm's Business Performance Construct.

Figure 25 depicts the 10-item single factor latent variable model for the business performance construct.

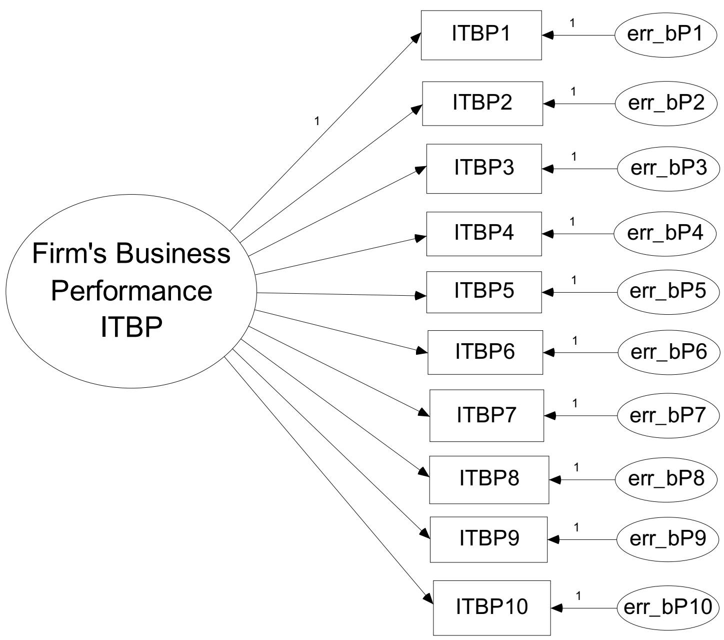

Figure 25 .Business performance construct

The model consists of the following parts:

1. There is one business performance factor as indicated by the ellipse labeled ITBP.
2. There are 10 observed variables as indicated by the 10 rectangles (ITBP1-ITBP10) and they represent items from the business performance subscales of the survey.

3. The observed variables load on the ITBP factor.
4. Errors of measurement associated with each observed variable are uncorrelated.

The measurement Model 4 was not a good fit to the data. As seen from Table 18, the goodness-of-fit indices were less than recommended values of 0.9 for acceptable fit (range: 0.687 to 0.772). Following the preceding model modification procedures used for the measurement model 1, including the AMOS modification indices, model 4 was modified to improve the fit. Results of the final modified model 4 are shown in Table 18.

Table 18

CFA Model 4 – Business Performance: Comparison of Goodness-Of-Fit Measures

Index	Shorthand	Initial model with 10 indicators (N = 349)	Modified model with 4 indicators (N = 349)
Chi-Square	χ^2	705.11 (p< 0.001)	8.13 (p = 0.02)
Degrees of freedom	df	35	2
Normed Chi-Square	χ^2/df	20.15	4.07
Goodness of Fit Index	GFI	0.69	0.99
Standardized root mean squared residual	SRMR	0.08	0.02
Root mean square error of approximation	RMSEA	0.23	0.09
		(0.22; 0.25)	(0.03; 0.17)
90% interval for RMSEA			
Normed Fit Index	NFI	0.76	0.99
Relative Fit Index	RFI	0.69	0.96
Incremental Fit Index	IFI	0.77	0.99
Comparative Fit Index	CFI	0.77	0.99

The input covariance matrix generated from the modified model's four observed variables contains 10 distinct sample moments. For the model, there are three regression weights and five variances, for a total of eight parameters to be estimated. The model has positive degrees of freedom (10 – 8 = 2), and the Chi-square goodness of fit statistic was computed by the AMOS software. The Chi-square value of 8.13 and the corresponding p value ($p = 0.02$) are based on the conventional 95% level indicating that the model was not a good fit.

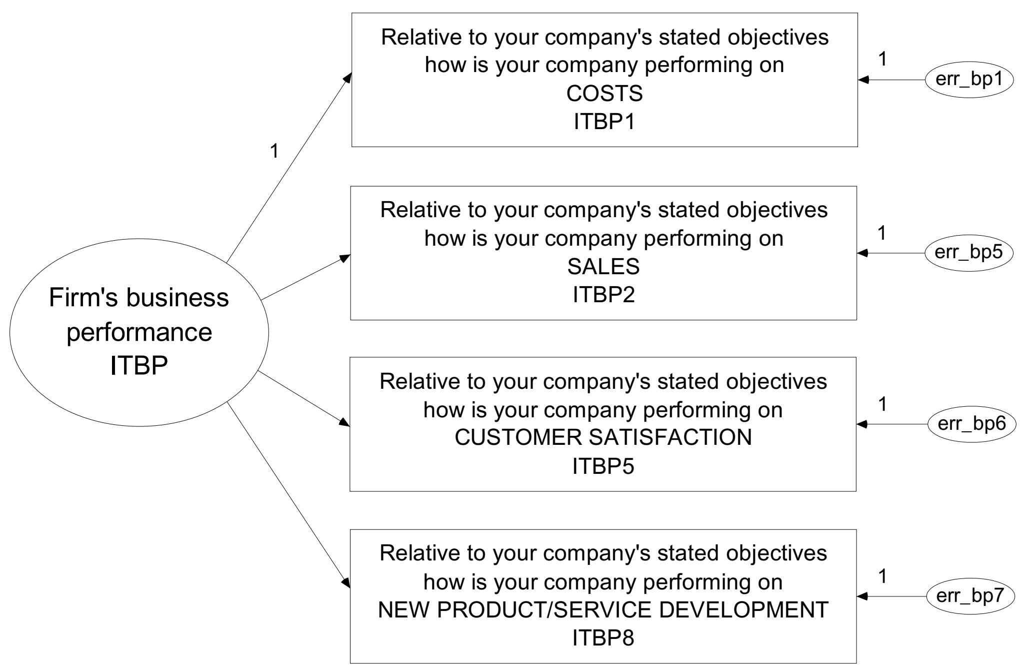

Figure 26 .Modified model for business performance construct.

Although the modified model did not fit the data based on the Chi-square test alone, the comparative fit indices showed good fit. The modified four indicator model (see Figure 26) achieved good fit based on the fit indices NFI, RFI, IFI, and CFI exceeding 0.9, the criteria for acceptable fit. The standardized root mean square residual (SRMR) value of 0.02 and the RMSEA value of 0.09 falling in the range of 0.03 to 0.17, both calculated by AMOS software, indicate that this four indicator model would describe the population covariance matrix, if it were available, reasonably well (Brown & Cudeck, 1993, p. 137).

The CFA results suggested that the modified four indicator measurement model of the business performance construct provided a good fit. The parameter estimates were examined next to assess the issues relating to construct validity. Face validity was established, as noted in chapter 3, section *Validity and Reliability of Measures*, through a pilot study, based on the content of the corresponding items. Convergent validity, construct reliability, and scale reliability were examined next in order to evaluate the validity of the business performance construct.

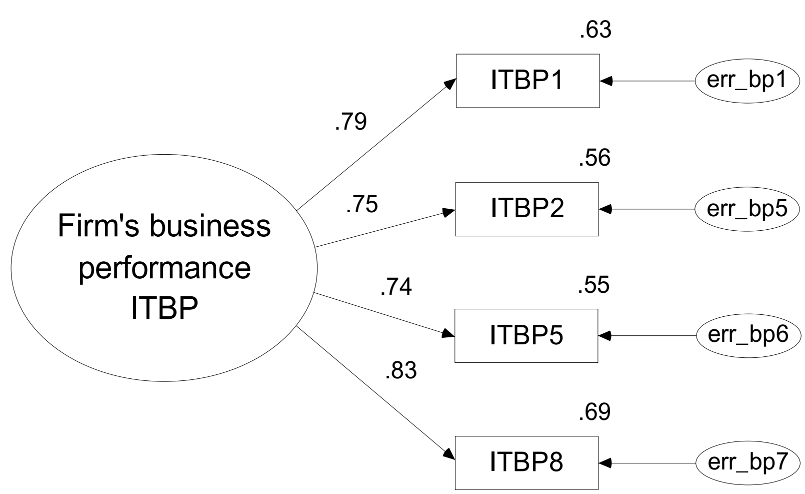

Figure 27 .Standardized factor loadings for the business performance construct.

First, the factor loadings were examined for the four indicator paths (see Figure 27) and were found to be positive, and statistically significant. Next, the average variance extracted was computed for the construct and was found to be greater than the desired 0.50 threshold (see Table 21). Then the Cronbach's alpha value was computed for the four items that load on construct and the composite score was greater than the desired 0.7. Taken together, the factor loadings, of the four scale items (see Figure 27), AVE (0.61), CR (0.83), and Cronbach's alpha (0.86) values indicated that convergent validity, construct and scale reliability existed.

The parameters estimated for the business performance construct (see Figure 27) indicated that the business performance of the firm is defined by the employees' perception of firm's relative performance in the areas of costs (ITBP1: $\beta = 0.79$), sales (ITBP2: $\beta = 0.75$), customer satisfaction (ITBP5: $\beta = 0.74$), and product/service quality (ITBP8: $\beta = 0.83$).

The Overall Measurement Model

The preceding CFA resulted in confirming the validity of the four measurement models The four antecedent variable constructs accountability, innovativeness, customer connectedness, and partnering with other departments and the three endogenous variable constructs the IT department's influence and power, the IT orientation, and the business performance were assessed for fit, convergent validity, and construct reliability. The next step in the measurement phase was to specify and test the overall measurement model. A visual diagram depicting the overall measurement model is shown in Figure 28. The model displays 24 measured indicator variables and seven latent constructs. In the measurement phase of SEM, all the constructs were allowed to correlate with all the other constructs. All measured items were allowed to load on only one construct each. Moreover, the error terms were not allowed to relate to any other measured variable. Each construct was measured by three indicators. Every individual construct was identified. The overall model had more degrees of freedom than paths to be estimated. Therefore, the model was considered overidentified.

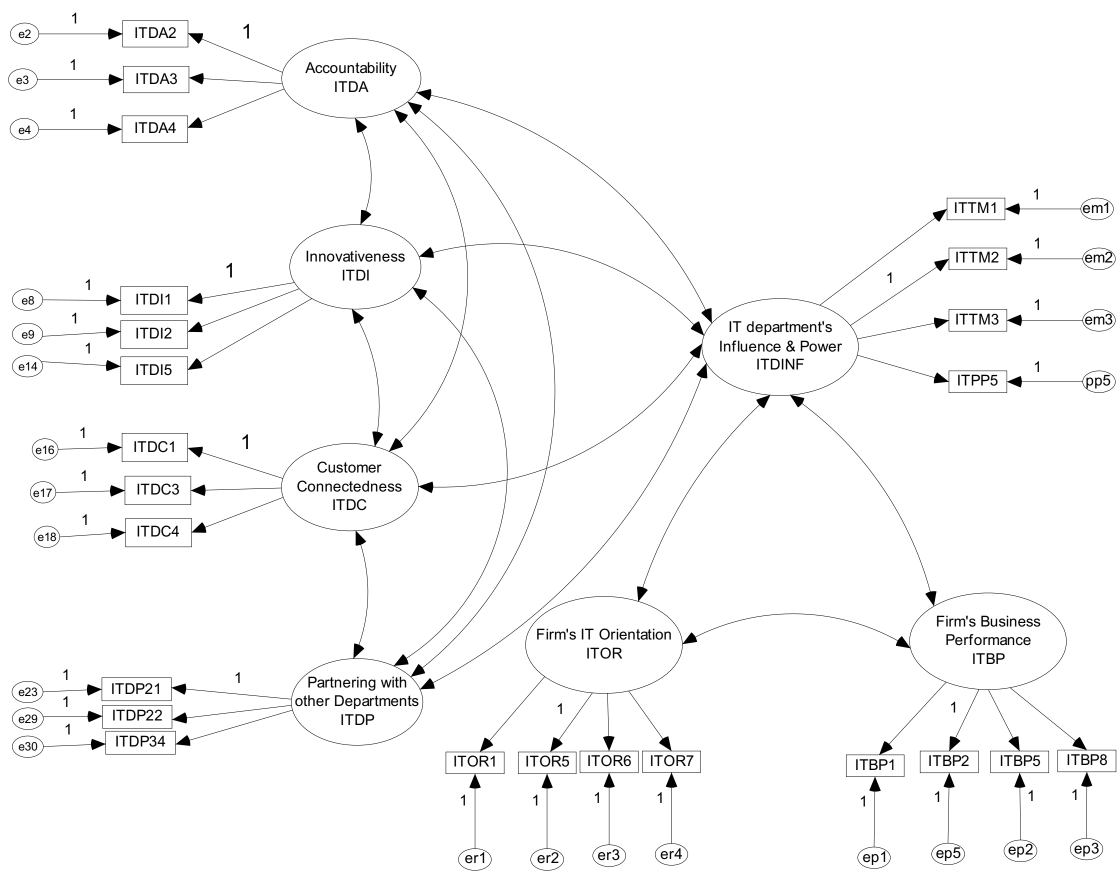

Figure 28 Overall Measurement Model

All of the measures were hypothesized as reflective. That is, the direction of causality is from the latent construct to the measured items. For example, a perception that the IT department, at the survey respondent's firm, lacks accountability (ITDA) would tend to cause low scores on each of the three indicators (ITDA2, ITDA3, ITDA4) loading on the accountability (ITDA) construct. Similarly, if the respondent's perception is that the top management of the respondent's firm does not think very highly of the IT department, the IT department would be perceived as having low levels of influence and power and would tend to cause low scores on each of the 3 indicators (ITTM1, ITTM2, ITTM3, ITPP5) loading on the IT department's influence and power (ITDINF) construct. Since each construct has a group of indicators that share a similar theoretical basis, it was expected that a change in one indicator would generate systematic changes in others.

The input covariance matrix generated by AMOS software from the model's 24 measurement variables contained 300 distinct sample moments. For the measurement model, there were 17 regression weights, 13 covariances, and 31 variances for a total of 61 parameters to be estimated. The model, therefore, had 239 degrees of freedom (300 – 61) and the Chi-square goodness-of-fit was computed (see Table 19). The Chi-square goodness-of-fit test showed that the model did not fit the data well. The incremental fit indices of NFI, RFI, IFI, and CFI used for baseline comparisons (see Table 19) were 0.90, 0.88, 0.93, and 0.93 respectively. For adequate fit, the SEM literature recommends a range of 0.89 to

0.94 for these fit indices (Ho, 2006). This indicated that the model fits the data reasonably well.

Based on the comparative fit indices values, the model fit to the sample data was adequate. However, the results were further assessed for any further improvement in model fit could be achieved. The path coefficients were examined for strength in the relationships between the constructs. An examination of the unstandardized and standardized correlational path coefficients were in the hypothesized direction (i.e., positive, no negative values), and had significance above the critical *t*-value of ± 1.96 for a Type I error of 0.05.

Table 19

Goodness-Of-Fit Measures: 24-Indicator Measurement Model

Index	Shorthand	Measurement model with 24 indicators (N=349)	Model Fits? Yes/No
Chi-Square	χ^2	847.68 (p< 0.001)	No
Degrees of freedom	df	239	
Normed Chi-Square	χ^2/df	3.55	Yes
Goodness of Fit Index	GFI	0.84	Yes/Marginal
Standardized root mean squared residual	SRMR	0.28	No
Root mean square error of approximation	RMSEA	0.09	Yes
90% confidence interval for RMSEA		0.080; 0.09	
Normed Fit Index	NFI	0.90	Yes
Relative Fit Index	RFI	0.88	Yes
Incremental Fit Index	IFI	0.93	Yes
Comparative Fit Index	CFI	0.93	Yes

Hair et. al., (2010) suggested that standardized path coefficient value exceeding |1.0| is an indicator of problems relating to (a) model identification, (b) data issues, and (c) poorly specified constructs (see). Examination of the data and the CFA output for the overall measurement model showed no standardized path coefficient value violating this condition. The CFA output provided by the AMOS software included either positive or negative standardized residuals. SEM literature suggests (e.g., (Hair et al., 2010; Ho, 2006) that a consistent pattern of large standardized residuals greater than |4.0| associated either with a single variable and a number of other variables or residuals for several of the variables within a construct raise a red flag and suggest a potentially unacceptable degree of error. Examination of the AMOS output showed several standardized residuals greater than |4.0| and some between |2.5| and |4.0| indicating a high level of error problem with the overall model. The automatic response here was to drop the items with residuals greater than |4.0|. However, guided by SEM literature and the AMOS software output recommendations, the systematic model modification approach, discussed in the preceding sections, was implemented. At this point, although the individual constructs were valid, the conclusion was, when coupled correlationally, the overall measurement model indicated major discrepancies in the model fit, and, therefore, from a strictly confirmatory evaluation perspective, the model fails, and any subsequent analysis was viewed as exploratory.

Following the guidelines discussed previously, the modification indices were used for item elimination. Although some items were significant in the single latent variable models, their contribution to the error terms, as indicated by the AMOS software output, suggested that dropping these items from the model would improve the model fit. The focus of the measurement phase was to improve the measurement properties of the model. Items were dropped in an iterative process checking the impact of the elimination of each indicator variable on the parameters and the fit indices of the model. Only three indicators were removed from the model. The model maintained the "three-indicator-rule" (Hair et. al, 2010), that is each latent construct was measured by a minimum of three indicators. Figure 34 depicts the final modified measurement model with 21 indicator variables.

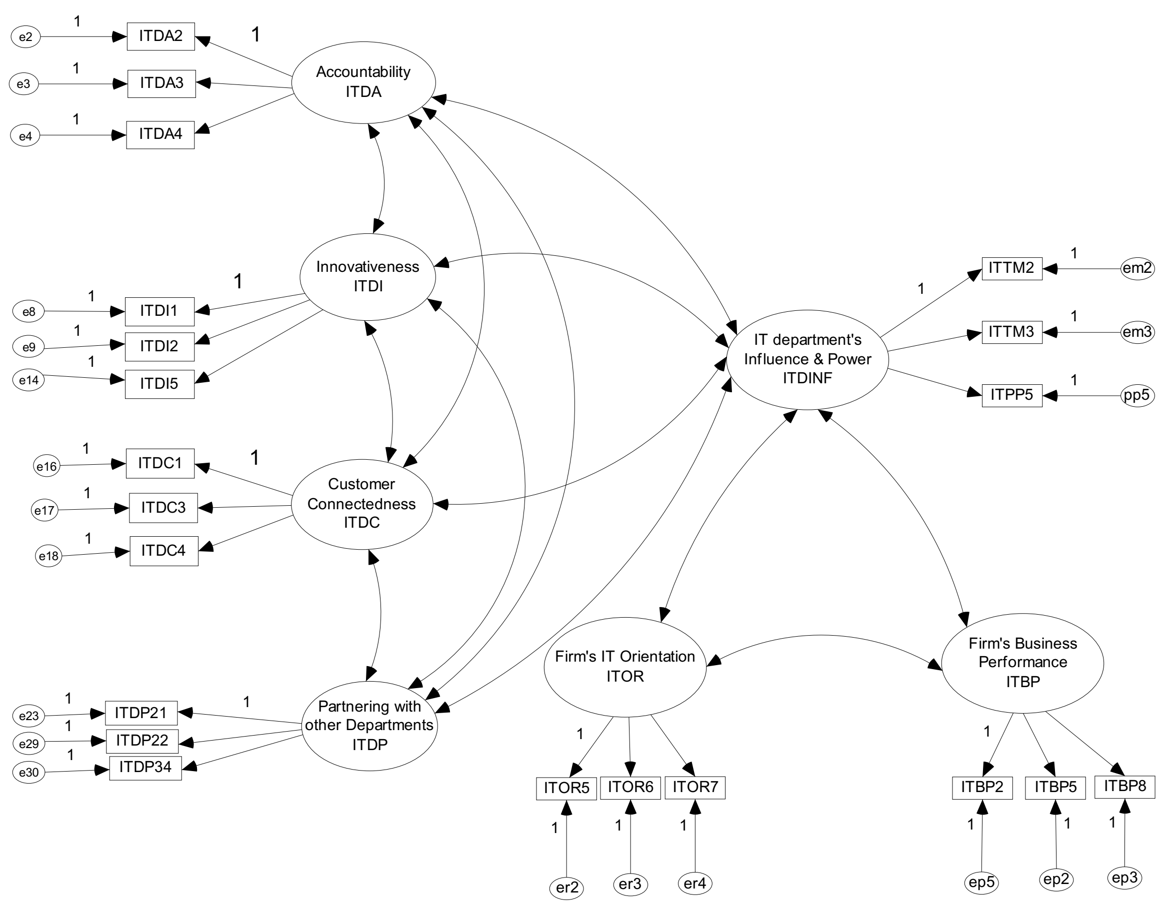

Figure 29 Modified overall measurement model.

The input covariance matrix generated by AMOS software from the model's 21 measurement variables contained 231 distinct sample moments. For the measurement model, there were 14 regression weights, 13 covariances, and 28 variances for a total of 55 parameters to be estimated. The model, therefore, has 176 degrees of freedom (231 – 55) and the Chi-square goodness-of-fit was computed (Table 20). The modified measurement model fit did not improve significantly based on Chi-square goodness of fit statistics and the incremental indices.

Table 20

Comparison of Goodness-Of-Fit Statistics - 24-Indicator Vs. 21-Indicator

Index	Shorthand	Measurement model with 24 indicators (N=349)	Measurement model with 21 indicators (N=349)
Chi-Square	χ^2	847.68 ($p < 0.001$)	700.77 ($p < 0.001$)
Degrees of freedom	df	239	176
Normed Chi-Square	χ^2/df	3.55	3.98
Goodness of Fit Index	GFI	0.84	0.85
Standardized root mean squared residual	SRMR	0.28	0.28
Root mean square error of approximation	RMSEA	0.09	0.09
90% confidence interval for RMSEA		(0.080; 0.09)	(0.08; 0.100)
Normed Fit Index	NFI	0.90	0.90
Relative Fit Index	RFI	0.88	0.89
Incremental Fit Index	IFI	0.93	0.93
Comparative Fit Index	CFI	0.93	0.93

At this point it was concluded that no further improvement in the measurement model could be achieved, and the next step was to test the hypothesized structural relations between the latent constructs.

Reassessment of Construct Measures – Theoretical Justification

The confirmatory factor analysis (CFA) described in the preceding sections was performed to determine whether the measurement model was valid. However, the process of testing the models using CFA also provided additional information, which suggested modifications to the models, to improve the test of models' measurement theory. Following the recommendations of SEM practitioners (e. g., Byrne, 2001; Ho, 2006; Hair et. al., 2010), the measurement models were modified to achieve a better fit. The model modification procedure consisted of freeing fixed parameters by removing the indicator variables one at a time until the fit of the model was satisfactory based on the recommended level of fit indices (Hair et. al., 2010; Ho, 2006; Hoe, 2008).

The measurement models were respecified, using guidance from the modification indices of AMOS software output, resulting in a better model fit. Since model modification involved item reduction, whether the remaining items continued to represent the originally intended concept of the variables was a concern. In this study, all the constructs were conceptualized, and the measurement items were constructed based on an extensive literature review. Previous research (e. g., Tallon et al., 2000, pp. 148-149) showed that perceptual measures could be used as proxies for objective measures. Several researchers (e. g., Petter et al., 2008; Tallon et al., 2000) suggested that senior managers and executives were in a better position (compared to the individual system users) to form perceptions about, and, therefore, are better informants of IT. Based on these and construct specific theoretical underpinnings this researcher developed scale items to measure each concept. Existing scales from other research domains were used when it was possible to do so. Otherwise, new scales were constructed. Since the models were respecified through the CFA process, whether the measurement scales continued to represent the initial conceptualization of the constructs is addressed in this section.

This researcher identified two content areas for the accountability concept. The first content area was the finance accountability. Literature review indicated that the IT departments were considered as a cost burden to the organization and managers are expected to justify the high cost of information technology resources (Lacity et al., 1996). Research in the accounting domain is abundant apropos the return on IT investment and budget allocation strategies of IT (Love et al., 2004). In the IS/IT domain, a plethora of theories has emerged over the last two decades, including the resource based view and transaction cost theory. Researchers have used them as theoretical lenses to study and understand the business value of IT. The second content area was the service accountability. The IT department is considered an internal service provider. Organizations install information technology based solutions to conduct their business. They range from the common email, internet, office productivity, and collaboration tools to specialized software applications such as the enterprise resources planning systems, accounting and human resources management applications, factory operations and quality management systems. The IT department is expected to maintain and preserve these information technology solutions. High availability is an expectation from the business users. When any of these IT systems fail, business may come to a standstill resulting in loss of revenue and affect the firm's employees, customers and suppliers. Together, the finance accountability and the service accountability formed the IT department's accountability concept. For the finance content area, Moorman and Rust (1999) developed measurement scales and Verhoef and Leeflang (2009) subsequently used the same scales in their research. Their research focus was the marketing function and the scales were appropriate for the current IT function study. Moorman and Rust (1999) used a 4-item 7-point Likert type scale anchored at 1 = *strongly disagree* and 7 = *strongly agree*. Verhoef and Leeflang used slightly modified 2-item 7-point Likert type scale anchored at 1 = *fully disagree* and 7 = *fully agree*. This researcher used the 2-item scale without modification to measure the *finance* content area of IT department's accountability. As for the service content area a suitable existing measurement scale could not be found and, therefore, this researcher constructed a pool of four items. The resulting 6-item accountability scale was used for collecting data. Through CFA, this researcher eliminated items from the original 6-item scale and arrived at the final 3-item scale for *accountability* which consisted of one item representing the finance content area from prior research discussed above (The IT department in my company shows the financial outcomes of their plans) and two items for the service content area constructed by this researcher. This researcher argues that the three items maintain the validity of the originally intended concept of accountability. Elimination of three items out of the six has not resulted in redefining the accountability construct.

The concept of innovativeness was formed based on the content area of idea generation, which is an act of innovation. This researcher developed a pool of six items. Four items were adapted from existing scales and two were constructed by this researcher. The 6-item scale was used for collecting data. Through CFA, three items were dropped. The final 3-item scale consisted of two existing validated items and one new constructed item. This researcher argues that elimination of three out of six items has not resulted in a new variable. The three remaining items maintain the originally intended concept of innovativeness.

Customer connectedness is a new scale developed by this researcher based on a single content area – customer knowledge. Although there are several subcategories of customer knowledge, for the current study the content area of interest is the set of activities that reflects attention to customers – gathering, sharing, and responding to customer needs (Deshpandé et al., 1993; Gatignon & Xuereb, 1997). Based on this idea, this researcher generated a pool of four items and used three of them in the final scale. This researcher argues that the final three item scale continues to represent the originally intended concept of customer connectedness.

The concept of partnering with other departments was defined by the content area of collaboration. Although collaboration is easily understood from its meaning, researchers attribute several activities to identify collaboration or collaborative behavior in organizations. These activities, depending upon the context of the researcher's investigation, may range from teamwork, sharing resources, and forming joint goals between departments (Kahn & Mentzer, 1996). The notion pursued here in the context of the current study is that managers ascribing to this philosophy would emphasize working with other departments within the firm in a consultative and cooperative manner. The IT function is generally viewed as working in isolation, an island unto itself (Peppard, 2001; Peppard, 2007) making it less accessible and, therefore, has fewer opportunities to influence others. Collaborative behavior inserts the IT department into many workflow processes within the firm increasing its pervasiveness which in turn increases the opportunities and the ability to influence others (Hickson et al., 1971; Hinings et al., 1974; Jarvenpaa & Ives, 1991). Following these theoretical underpinnings, this researcher adapted the 7-item collaboration scale developed by Stank et al., (1999) to study logistics integration. The final questionnaire consisted of 42 subscales. However, the scale was intended to measure collaboration in seven areas with six other departments. The seven definitions of collaboration were assigned to the six functional departments resulting in 42 subscales. My company's IT department (a) has informal working relationship with…, (b) shares ideas/information and resources with…, (c) Works together as a team with…, (d) conducts joint planning to anticipate and resolve problems with…, (e) achieves goals collectively with…, (f) develops a mutual understanding of responsibilities with…, (g) makes joint decisions with…. The departments assigned were (a) marketing/sales, (b) HR/personnel, (c) R & D/Engineering, (d) manufacturing/operations, (e) customer service, and (f) accounting/finance. Through CFA, five of the seven collaboration attributes were dropped, and three of the six departments were dropped. Since it appears that 39 items were dropped, a concern is whether the 3-item scale is representative of the original scale. This researcher argues that from a collaborative behavior perspective the definitions of informal working relationship, sharing ideas, information, and resources, and working together as a team encompass the other four definitions. When the IT department is able to maintain informal working relationships with other departments, it is also able to develop a mutual understanding of responsibilities with those departments. Therefore, dropping the item mutual understanding of responsibilities does not alter the representation of collaborative behavior. When the IT department is able to share ideas, information and resources with other departments, it is also able to make joint decisions and conduct joint planning with other departments. In order to make collective planning and decisions, one must share ideas and information. Finally, working together as a team is perhaps the most common definition of collaborative behavior. Based on these theoretical underpinnings, this researcher argues that the final 3-item scale maintains the validity of the originally intended concept of collaborative behavior.

The concept of IT department's influence and power was defined by perception and reality. Employees form perceptions about others within the firm based on their interaction experience with others. On the other hand the top management team (TMT) makes strategic decisions which are real and everyone within and outside the firm understands it. TMT has the power and authority to assign importance and commit resources. When the TMT teats the IT department as important, it is real and others abide by it. Based on these concepts, this researcher constructed a pool of five items to collect data on the perceived power concept. Three of the five items were adapted from Mooreman and Rust (1999) and two were constructed. A four-item scale developed by Teo and King (1997) and Verhoef and Leeflang (2009) was adapted and two more items were constructed to collect data on the respect at the top management level concept. Through CFA, a final 3-item scale consisting of two existing items and one new item measured the IT department's influence and power construct. This scale maintains the originally intended concept of IT department's influence and power. The two items, the top management in my company is committed to support the IT department, and the top management in my company views IT spending as important and strategic investment, were validated in a previous study (Teo & King, 1997) and therefore maintain the concept that TMT treats a department as important.

The business performance construct was identified with three content areas. The financial performance content area consisted of four items. The content area of customer relationship performance consisted of three items. The third content area, new product performance, consisted of three items. All items of this scale were previously developed and validated by Moorman and Rust (1999). The confirmatory factor analysis of this scale in the overall measurement model resulted in the elimination of seven items. The final 3-item business performance scale had one item from each content area. The finance content area was represented by sales element of business performance (relative to your company's stated objectives how is your company performing on sales). The content area of customer relationship performance was represented by the customer satisfaction element (relative to your company's stated objectives how is your company performing on customer satisfaction). The new product performance content area was represented by the financial performance of new product/service (relative to your company's stated objectives how is your company performing on the financial performance of new product/service development). These are subjective managerial perceptions of objective business performance data. Sales, customer satisfaction, and new product/service financial performance are familiar business performance measures that senior managers can easily talk about and develop perceptions which are close to reality (objective data). It is difficult to create common, valid business performance measures across diverse industry types (Moorman & Rust, 1999). Therefore, this researcher used the readily available measurement scales which were already validated by previous research. The three items represent the original three content areas conceptualized for this construct, and they were validated in previous studies (e.g., Moorman & Rust, 1999; Verhoef & Leeflang, 2009) in the marketing domain. Therefore, this researcher argues that the 3-item scale continues to maintain the originally intended concept of firm's business performance.

An existing instrument could not be found to measure the IT orientation concept. This researcher constructed a pool of nine items. To define the IT orientation concept, this researcher identified awareness as the major content area. This was based on organizational learning construct developed by Templeton, Lewis, and Snyder (2002). Employees who are aware of problems in their domain seek ways to resolve those problems. For example, a sales and marketing person may be having problems with coordination and communication with customers and internal partners in a timely manner regarding a sales negotiation. These problems may range from not being able to contact someone internally regarding pricing of a product quickly to maintaining information regarding potential sales opportunities and prospective customers. Awareness of these and other problems, and awareness of who may have the expertise within the organization to resolve the problems is an organizational learning process (Templeton, Lewis, & Snyder, 2002). Specifically, in today's Internet and IT based organizations, the awareness of problems and potential solutions cannot exclude information technologies. Employees not only seek IT solutions but also learn about what technology solution is available inside and outside the organization. Awareness drives the employees and managers to learn and seek new ways of using information technologies to be more productive at their workplace. These employees will not pass up opportunities to learn about new IT solutions.

According to Lucas and Spitler (1999), social norms, including collaboration with colleagues and others, has a greater impact on the use of information technologies. These social norms also develop the awareness. The notion is the employees' eagerness to increase their awareness and learning, driven by their own passion to solve problems, results in an environment of IT orientation. In this study, the word “orientation” is used to describe both learning and awareness holistically to use information technologies. The result is the organization as a whole has IT orientation or is IT savvy to exploit IT to solve business problems, to connect with customers and suppliers, to collaborate, in sum to exploit IT to improve its business. Based on these theoretical assertions and the organizational learning construct (Templeton, Lewis, & Snyder, 2002) this researcher developed a pool of 10 items. The content of these items focused on learning information technologies, being aware of what IT solutions are available, being aware of how IT can help business. The CFA of this construct resulted in the final three items: (a) managers and employees are eager to attend software training, (b) managers and employees are well aware of information technology solutions available in the market, and (c) managers and employees believe in information technology solutions for business. These three items represent the original content areas of learning and awareness conceptualized for this construct. Therefore, this researcher argues that the measurement theory of this construct holds, and the variable IT orientation has not been altered.

In summary, from a theory construction and theory testing perspective, the confirmatory factor analysis of the constructs and the process of respecification of the measures by item reduction did not result in loss of the integrity of the measurement theory upon which the variables were constructed.

Summary of the Measurement Models

For the most part, the measurement model analysis was exploratory in nature. The four measurement models analyzed in the preceding sections were a reasonably good fit to the sample data after the initial models were modified by removing the nonsignificant indicators and paths. The modification procedures were theoretically sound, supported by previous research, and implemented by removing one parameter at a time. Only those parameters that could not explain a significant amount of the variance in the latent (unobserved) variable as evidenced by the R-square values were chosen for removal. Modification indices were used to determine the magnitude of impact on the parameter estimates, and the indicators were selected for removal based on modification index value greater than 10. It is reasonable to conclude that the idea, that the theory regarding the four antecedent variables construct, the IT department's influence and power construct, the firm's IT orientation construct, and the firm's business performance construct are defined by their respective indicator groups, fits reality reasonably well. It is also reasonable to conclude that the theory is supported by the goodness of fit of four measurement models, and the final composite measurement model, to the sample data. Next, the structural relations between the latent variables were modeled and examined.

Overall Structural Model

The structural theory discussed in chapter 1 expected that the antecedent variables ITDA (accountability), ITDI (innovativeness), ITDC (customer connectedness), and ITDP (partnering with other departments) are all positively related to the dependent variable ITDINF (IT department's influence and power). For example, a high ITDA score indicates that the IT department practices high accountability characterized by simplicity and information sharing (Seiling, 2001). It keeps the lines of communication open and other departments do not feel patronized or threatened by the IT department (Seiling, 2001). This capability makes the IT department more credible with other departments within the firm and increases its influence and power within the firm. Based on the theoretical model developed in chapter 1 the following seven hypotheses were tested.

- $H1_a$: The Accountability of the IT department is positively related to the IT department's influence and power within the firm.
- $H2_a$: The Innovativeness of the IT department is positively related to the IT department's influence and power within the firm.
- $H3_a$: The Customer connectedness of the IT department is positively related to the IT department's influence and power within the firm.
- $H4_a$: The Collaboration of the IT department is positively related to the IT department's influence and power within the firm.

- $H5_a$: IT department's influence and power is positively related to the firm's IT orientation.
- $H6_a$: Firm's IT Orientation is positively related to the firm's Business performance.
- $H7_a$: IT department's influence and power within the firm is positively related to the firm's business performance.

In the structural equation modeling phase, a new confirmatory model was generated using the AMOS software graphical user interface. The independent constructs namely accountability, innovativeness, customer connectedness, and partnering with other departments were allowed to correlate. The focus of the structural phase was to test the structural relationships by examining the overall and relative model fit as a measure of acceptance of the theoretical model and structural parameter estimates.

Structural model validity. The theory tested in this study is depicted visually in Figure 30.

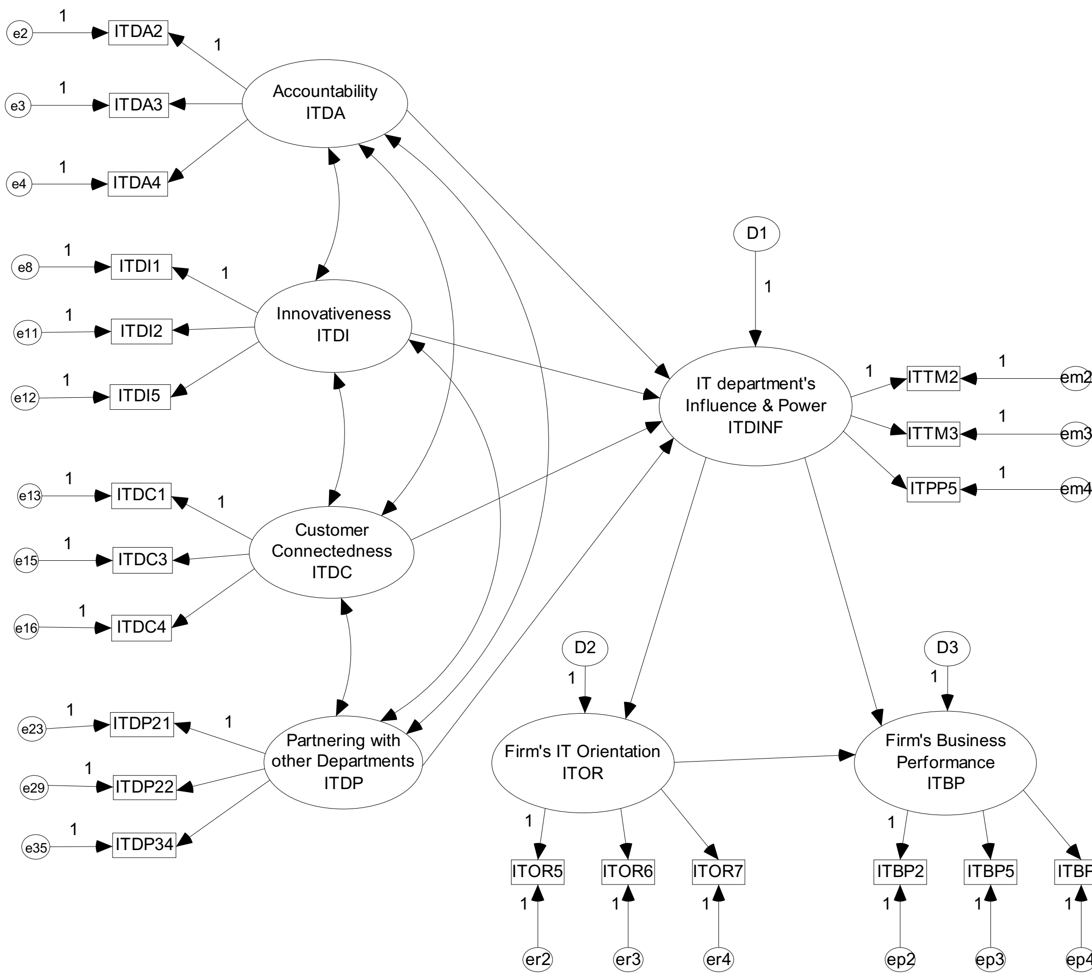

Figure 30 Overall structural model

ITDA, ITDI, ITDC, and ITDP are exogenous constructs. They are considered to be determined by things outside this model. Therefore, no hypothesis predicting these constructs was tested in this study. There are no single headed arrows entering these constructs.

The overall structural model was estimated, and assessed emphasizing two criteria: (a) SEM model fit, and (b) whether the structural relationships are consistent with the theoretical expectations outlined in chapter 1. The AMOS software was then run to estimate the parameters and compute the goodness of fit indices. The 21 indicator structural model Chi-square 523.543 with 176 degrees of freedom ($p < 0.05$) resulted in the normed Chi-square value of 2.975. The model CFI is 0.953 with a RMSEA of 0.075 and a 90% confidence interval of 0.068 to 0.083. All of these measures were within a range that would be associated with a good fit. These goodness-of-fit diagnostics suggested that the structural model provided a good overall fit. Table 21 shows the fit statistics for the overall structural model.

Table 21

Goodness-Of-Fit Indices for the Overall Structural Model

Fit Index	Recommended Level of Fit	Fit values for overall structural model	Model Fits? Yes/No
χ^2	Not significant at p<.05	505.60, *p* = .00 Significant	No
χ^2/df	< 5	505.6/176 = 2.87	Yes
GFI	> 0.90	0.87	Yes (Marginal)
NFI	> 0.90	0.93	Yes
RMSEA	< 0.08	0.07	Yes
SRMR	< 0.08	0.06	Yes
RFI	> 0.90	0.92	Yes
CFI	> 0.90	0.95	Yes
IFI	> 0.90	0.95	Yes

The goodness of fit statistics for the measurement model and the structural model are compared in Table 22. The path coefficients and loading estimates were examined, and no significant change was observed from the CFA phase to the SEM phase.

Table 22

Comparison of Fit Indices for Measurement and Structural Models

Index	Shorthand	Measurement model with 21 indicators (N=349)	Structural model with 21 indicators (N=349)
Chi-Square	χ^2	700.77 (p =.00)	505.60, (p = .00)
Degrees of freedom	df	176	176
Normed Chi-Square	χ^2/df	3.98	2.87
Goodness of Fit Index	GFI	0.85	0.87
Standardized root mean squared residual	SRMR	0.28	0.06
Root mean square error of approximation	RMSEA	0.09	0.07
90% confidence interval for RMSEA		(0.08; 0.100)	(0.07; 0.08)
Normed Fit Index	NFI	0.90	0.93
Relative Fit Index	RFI	0.89	0.92
Incremental Fit Index	IFI	0.93	0.95
Comparative Fit Index	CFI	0.93	0.95

Table 23 shows the estimated unstandardized structural path coefficient estimates. All the parameter estimates were found to be in the expected direction. All, but one, parameter estimates were significant. The exception was the path coefficient estimate between ITDC and ITDINF with significance below the critical value for a Type I error of 0.05. Therefore, although the statistical parameter estimate is in the hypothesized direction, it is not supported. Overall, however, given that the six of the seven estimates were consistent with the hypotheses, these results support the theoretical model, with a caveat for the one path that is not supported.

Table 23

Unstandardized Structural Path Coefficients

			Estimate	S.E.	C.R.	P
ITDINF	<---	ITDI	.27	.14	1.95	.047
ITDINF	<---	ITDC	.10	.10	1.00	.328
ITDINF	<---	ITDP	.31	.08	3.94	***
ITDINF	<---	ITDA	.24	.11	2.07	.044
ITOR	<---	ITDINF	.60	.05	13.31	***
ITBP	<---	ITDINF	.13	.04	3.00	***
ITBP	<---	ITOR	.38	.06	6.37	***

Note. *** = $p < .001$, S.E. = Standard error, C. R. = Critical ratio.

Model Diagnostics. Comparison of the Chi-square statistic between the hypothesized model and the measurement model showed a Chi-square difference of 195.2 with zero degrees of freedom ($p < 0.001$). As indicated before, patterns of large standardized residuals and or large modification indices indicate changes in the structural model resulting in model improvement.

Examination of the standardized residuals and modification indices of the structural model did not indicate any patterns of large values. There were no standardized residual values greater than |4.0|. Only four standardized residual values, associated with the ITDC construct, were found to be between |2.5| and |4.0|. This researcher did not see a need to modify the structural model since there was no indication that any further improvement to the model fit was possible.

Next, the path coefficients and factor loading estimates were examined to make sure there were no substantial changes from the measurement model to the structural model. As can be seen from the results shown in Table 24, the loading estimates remained practically unchanged from the measurement model results.

Table 24

Comparison of Standardized Factor Loadings: Structural and Measurement Models

		Standardized factor loading	
Indicator	Construct	Structural Model	Measurement Model
ITDA2	ITDA	0.87	0.87
ITDA3	ITDA	0.87	0.87
ITDA4	ITDA	0.87	0.87
ITDI1	ITDI	0.93	0.93
ITDI2	ITDI	0.94	0.94
ITDI5	ITDI	0.86	0.86
ITDC1	ITDC	0.63	0.63
ITDC3	ITDC	0.86	0.86
ITDC4	ITDC	0.95	0.95
ITDP21	ITDP	0.95	0.95
ITDP22	ITDP	0.93	0.93
ITDP34	ITDP	0.84	0.84
ITTM2	ITDINF	0.92	0.93
ITTM3	ITDINF	0.92	0.92
ITPP5	ITDINF	0.80	0.76
ITOR5	ITOR	0.81	0.80
ITOR6	ITOR	0.89	0.90
ITOR7	ITOR	0.86	0.85
ITBP2	ITBP	0.69	0.69
ITBP5	ITBP	0.72	0.72
ITBP8	ITBP	0.90	0.90

Thus, based on the data shown in Table 24, it was reasonable to conclude that if parameter stability had not already been tested during the measurement phase, the structural phase provided evidence that the measured indicator variables were stable. This indicated that there was no problem with the validity of the measurement model due to any “interpretational confounding” (Hair et al, 2010, p. 724). With so little change in the standardized loadings, the construct reliabilities also remained stable as expected (see Table 25). Thus, if parameter stability had not already been tested in the measurement phase (CFA), the structural phase showed evidence of stability among the measured indicator variables and constructs.

Table 25

Comparison of Construct Reliabilities: Structural and Measurement Models

Construct	Description	Construct Reliabilities	
		Structural model	Measurement model
ITDA	Accountability	0.80	0.80
ITDI	Innovativeness	0.87	0.87
ITDC	Customer connectedness	0.69	0.68
ITDP	Partnering with other departments	0.85	0.85
ITDINF	IT department’s influence and power	0.83	0.82
ITOR	Firm’s IT orientation	0.81	0.81
ITBP	Firm’s business performance	0.91	0.91

Model Evaluation, Interpretation of Results, and Hypotheses Testing

Grace (2006) suggested three model evaluation and comparison categories: (a) strictly confirmatory, (b) involving a nested series of models, and (c) purely exploratory. In his seminal work on the theory of causation, path analysis and path coefficients, Sewall Wright stated:

> [T]he method itself depends on the combination of knowledge of degrees of correlation among variables in a system with such knowledge as may be possessed of the causal relations. In cases in which the causal relations are uncertain, the method can be used to find the logical consequences of any particular hypothesis in regard to them…and the method is by no means restricted to relations that can be described as ones of cause and effect. (Wright, 1960, p. 191)

The implication of Wright's (1960) advice is that the researcher should interpret the strength of the SEM analysis results based on an assessment of the "strength of support for any causal structure and mechanistic interpretation," (Grace, 2006, p. 208) and include that amount of support so determined in the final analysis and interpretation of the SEM results. This researcher further argues that the data set used in the current study may or may not have represented this researcher's strongest source of information about the system characterized by the research model tested here. Because, the relative strengths of the current information provided by the key informants to this study, based on their prior, experiential information, were situational and influenced by many things in an organizational setting. This could not be ignored when attempting to evaluate the models tested in this study and drawing conclusions regarding general validity.

At the outset, a strictly confirmatory approach to model testing was taken in this study. The first step of the SEM analysis in this study involved the confirmatory factor analysis to investigate the psychometric properties of individual constructs and simultaneously assess the fit of the overall measurement model. Byrne (2006) suggested a number of criteria that need to be met for the validity of a theoretical construct. First, the latent variable can be explained by the hypothesized constructs; second, each item measure has a nonzero loading on the factor it is designed to measure and a zero loading to all other factors; third, the factors are correlated consistent with theory; and finally the error-uniqueness associated with each measure are uncorrelated. Furthermore, for the purposes of item identification and determining the scale of latent variables, either one of the indicators or the factor variance needs to be fixed (set to 1.0), while all other parameters are freely estimated (Byrne, 2006; Kline, 2005). If a latent construct is a dependent variable, however, its variance cannot be fixed as the paths leading to this dependent variable explain its variance.

Measurement (CFA) Model Evaluation and Interpretation

After creating the manifest variables that were possibly related to the four latent antecedent variables, one latent variable of IT department's influence and power, one latent variable of IT orientation, and one latent variable of business performance, and before utilizing SEM, confirmatory factor analysis was performed to examine the correlations between the latent variables and manifest variables. The maximum likelihood (ML) Chi-square showed that the full initial model with 88 indicators did not fit the data. At this point, from a strictly confirmatory method perspective, the subsequent analysis conducted is this research was considered exploratory in nature. The hypothesized structure of the modified CFA model with 21 indicators indicated a reasonably good fit to the data analyzed in this study. This was also confirmed by the results from the SEM analysis discussed in the next section. The measurement model ML Chi-square provided evidence (normed Chi-square = 4.079) together with the comparative fit indices (NFI = 0.90; RFI = 0.88; CFI = 0.93) supporting the goodness of model fit for the hypothesized factor structure between the latent variables as well as between the latent and manifest variables for the modified model. Hence, it was reasonable to conclude that the prior hypothesized structure was valid. The research question "what factors shape the IT department's influence and power" has a valid answer: the four antecedent variables shape it. This was further confirmed by the path coefficients (regression weights) discussed in the following paragraphs.

Results of the measurement model suggested that the accountability behavior of the IT department was manifested by the IT department's willingness to share financial information (ITDA2: $\beta = 0.87$), checking up on itself (self-audit) on how effective it is (ITDA3: $\beta = 0.87$), and high quality internal customer service (ITDA4: $\beta = 0.87$). The innovativeness of the IT department is evidenced by the opinion of others within the firm that their IT department is a highly creative department (ITDI1: $\beta = 0.93$), offers new ideas on how to improve business processes to achieve business goals (ITDI2: $\beta = 0.94$), and tries out new information technologies (ITDI5: $\beta = 0.86$). The IT department's awareness of the firm's external customers was evidenced by how frequently the external customers directly contact the IT department of a firm (ITDC1: $\beta = 0.63$), how frequently the internal departments contacted the IT department regarding the external customers' needs (ITDC3: $\beta = 0.86$), and the IT department's awareness and skill to include the external customers' needs into the firm's strategy (ITDC4: $\beta = 0.95$). The IT department's collaborative (or partnering) behavior with other non-IT departments within the firm was evidenced by the IT department's willingness to share ideas and information with other departments (ITDP21: $\beta = 0.95$, ITDP22: $\beta = 0.93$) and teamwork with other departments (ITDP34: $\beta = 0.84$). The measurement model results also suggested that the IT department's influence and power was characterized by what the top management team (TMT) thought about the IT department and how the TMT treated the IT department: (a) TMT's view that IT spending was important and strategic investment (ITTM3: $\beta = 0.92$), (b) the TMT's commitment to support the IT department (ITTM2: $\beta = 0.93$), and (c) what the other departments within the firm thought of the IT department's views and opinions, the other departments valued the IT department's opinions (ITPP5: $\beta = 0.76$).

Taken together, the results showed that the theory regarding the antecedents of the IT department's influence and power was measurable, valid, and was supported by the positive correlation between the antecedents and the IT department's influence and power. As the IT department exhibits a high degree of accountability, innovativeness, customer connectedness and collaboration with other departments (correlations ITDINF: ITDA = 0.77, ITDINF: ITDI = 0.78, ITDINF: ITDC = 0.71, and ITDINF: ITDP = 0.76) a positive effect is brought to bear on its influence and power because the other departments and the TMT think highly of the IT department.

The measurement model suggested that the IT orientation (or IT savvy) of the firm was a manifestation of the company's employees' own volition: (a) employees were eager to acquire knowledge about new technology (ITOR5: β = 0.80), (b) employees were well informed about new information technologies available to them for exploitation (ITOR6: β = 0.90), and (c) employees believed that information technologies could help the business (ITOR7: β = 0.85). On the contrary, the IT department's influence and power did not determine the level of IT orientation (IT savvy) of the firm as evidenced by a weak correlation (correlation ITDINF:ITOR = 0.18). The measurement model results also suggested that the IT orientation (IT savvy) of the firm could affect business performance positively to a greater degree (correlation ITOR: ITBP = 0.68) compared to the positive effect of IT department's influence and power (correlation ITDINF: ITBP = 0.13). Taken together, these inferential statistics results appear to indicate that the firm's IT savvy employees who are technology savvy with a high level of technology awareness, who want to learn about new technologies on their own and who believe information technologies can help their business with a greater positive influence on the business performance elements including customer satisfaction, customer retention, and product/service quality compared to the effect of IT department's influence and power. The implication of this is that perhaps firms do not need an influential IT department to increase their business performance. On the other hand, this also indicates that the IT department can indeed affect the firm's business performance positively.

This researcher posited *a priori* that the antecedent variables are correlated with each other. When an IT department demonstrates a high degree of accountability through information sharing and playing a consultative role, it also provides opportunities to solve problems that the other users within the firm encounter, thus contributing to the perception that the IT department is a creative and innovative department (correlation ITDA: ITDI = 0.92). IT department's awareness and understanding of the firm's external customers also puts it in a position of more collaboration with other departments. For instance, if the sales department needs to implement electronic transactions with a new customer, it will seek out the IT department's help and involve the IT department in all coordination efforts. Thus, customer connectedness and collaboration are highly correlated (correlation ITDC: ITDP = 0.85). High accountability behavior also puts the IT department in a highly collaborative behavior (correlation ITDA:

ITDP = 0.81). The perception that IT department understands the firm's external customers' needs also brings opportunities to solve customers' problems in creative ways (correlation ITDC: ITDI = 0.85). An innovative IT department collaborates with other departments to solve problems. The non-IT departments may seek the IT department's expertise to get their problems resolved. This dependence could increase the opportunities for collaboration between the IT department and the non-IT departments within the firm (correlation ITDI: ITDP = 0.87). Accountability, innovativeness, customer connectedness, and collaborative behavior also positively affect the IT department's influence and power (correlations 0.77, 0.78, 0.71, and 0.76 respectively). Taken together, it is reasonable to conclude that the antecedent variables shape the IT department's influence and power.

In summary, results from confirmatory factor analysis confirm the existence of the correlations among the four antecedent variables as well as the correlations between the latent variables and the manifest variables. In order to further examine the causality relationship, this researcher constructed and tested a structural equation model which is discussed in the next section.

Structural Model Evaluation and Interpretation

The SEM tests showed that structural relations existed without a doubt between the antecedent variables and IT department's influence and power. The focus of the analysis in this section is the specific values and direction of the parameters and not on the choice among alternative models or different structural relationships. Stated differently, the interest in this study is the relative strengths and impact of the pathways in the model as indicated by the magnitude and the sign (positive or negative) of the path coefficients.

Results indicated a positive relationship between the IT department's influence and power, and the four antecedent variables, a positive relationship between the IT department's influence and power, and IT orientation and business performance. The positive relationships thus support the a priori hypotheses of this research. The theory that antecedent variables exist and that they have a positive effect on the IT department's influence and power is a valid theory supported by existing and previous literature. However, the relative strength of the positive effect may depend on the data set used for testing the structural relationship. As stated previously, the data set used in the current study may or may not have represented this researcher's strongest source of information about the antecedent variables and the IT department's influence and power. Because, the relative strengths of the current information provided by the key informants to this study, based on their prior, experiential information, were situational and influenced by many things in their organizational setting.

After completing the confirmatory factor analysis, this researcher transformed the measurement model into a structural model by redefining the correlational relationships (double headed arrows) between the latent constructs into structural relationships (single headed arrows). The hypothesized structure of the structural equation model with 21 indicators fits into the data analyzed in this study. The SEM ML Chi-square provides evidence (normed chi-square = 2.87; RMSEA = 0.07) together with the comparative fit indices (NFI = 0.93; RFI = 0.92; CFI = 0.95) supporting the goodness of model fit for the hypothesized factor structure between the latent variables. Hence, it is reasonable to conclude that the use of this researcher's prior hypothesized structure is valid. The research question "what factors shape the IT department's influence and power" has a valid answer: the four antecedent variables shape it. This is further confirmed by the path coefficients (regression weights).

Results of the structural model suggested that the antecedents accountability (ITDA), innovativeness (ITDI), and the partnering behavior (ITDP) of the IT department were highly significant predictors of the IT department's influence and power (ITDINF) as indicated by the critical ratios (*C.R.* = 2.07, $p < 0.05$; *C.R.* = 1.95, $p = 0.05$, and *C.R.* = 3.94, $p < 0.05$, respectively). These relations are not only significant but also of substance as indicated by the magnitude of the respective standardized path coefficients (0.24, 0.28, and 0.33 respectively). Intuitively, and theoretically, IT department's willingness to share information regarding the financial outcomes of its plans, checking up on itself (self-audit) on how effective it is so that it can improve, and high quality internal customer service are all behaviors related to generating positive perceptions. Other departments and employees of the firm think that the IT department is a helpful department, that it is transparent, has nothing to hide. These perceptions can also affect the top management team's perceptions regarding the IT department in a positive light (Seiling, 2001). This is also supported by the measurement model as discussed in the preceding section.

The structural model results suggested that the customer connecting capability of the IT department is not of significance ($C.R = 0.979$, $p = 0.328$), although positively associated with the IT department's influence and power. The measurement model indicated that the IT department's awareness of the firm's external customers is evidenced by three indicators: (a) how frequently the external customers directly contact the IT department of a firm, (b) how frequently the internal departments contact the IT department regarding the external customers' needs, and (c) the IT department's awareness and skill to encompass external customers' needs into the firm's strategy. These are behaviors positively related to the IT department's influence and power. In reality organizations place a high value on these behaviors (Seiling, 2001).

The structural model suggested that an influential IT department in a firm was a significant predictor of the IT orientation (IT savvy) of the firm ($C.R = 13.209$, $p < 0.001$). On the contrary, the measurement model suggested a weak correlation between the IT department's influence and power and IT orientation (IT savvy) of the firm (correlation 0.18). This researcher posited a priori that this might be the case. While an influential IT department may contribute to the IT savvy of the organization, it is also possible that the IT orientation (IT savvy) of the firm may have a positive effect on the IT department's influence and power. The notion is that the structural model is a representation of the organization level dynamics, where as the measurement model is a representation of the item level (individual level) perceptions. At the organization level, the IT department could positively affect the IT orientation (IT savvy) of the firm as evidenced by a strong and statistically significant path coefficient in the structural model. On the contrary, at the individual level, the IT orientation (IT savvy) is a result of the employee's own desire to be technology savvy as evidenced by a weak correlation in the measurement model. The structural model results also suggested that the IT orientation (IT savvy) of the firm could affect business performance positively to a greater degree ($\beta = 0.53$, $C.R = 6.37$, $p < .001$) compared to the effect of IT department's influence and power on business performance ($\beta = 0.22$, $C.R = 3.00$, $p < .001$). These findings were also supported by the measurement model as discussed in the preceding section.

This researcher posited a priori that the antecedent variables have a positive effect on the IT department's influence and power. The positive direction is supported by both the measurement model and the structural model. The structural model suggested that three out of four antecedents had a significant, positive effect.

Hypotheses Testing

While previous research (e.g., Saunders & Scamell, 1982) found that the IT department did not have influence and power, this study accepted that finding as a given and sought to identify factors that have an effect on the IT department's influence and power. The hypotheses outlined in this study suggest that there are four antecedent variables which have a positive effect on IT department's influence and power namely accountability, innovativeness, customer connectedness, and partnering with other departments. The hypotheses further suggest that the IT department's influence and power has a positive effect on the firm's IT orientation and business performance and also that the IT orientation of the firm has a positive effect on the firm's business performance.

Accountability. Hypothesis H1: Accountability is an antecedent affecting the IT department's influence and power within the firm.

$H1_0$: There is no relationship between Accountability and the IT department's influenceand power within the firm;

$H1_a$: The Accountability of the IT department is positively related to the IT department's influence and power within the firm.

The null hypothesis was rejected. The alternative hypothesis was supported based on a standardized path coefficient (β) value of 0.24 and a critical ratio (*t*-value) of 2.07 at the p=.05 significance level.

Innovativeness. Hypothesis H2 : Innovativeness is an antecedent affecting the IT department's influence and power within the firm.

$H2_0$: There is no relationship between Innovativeness and the IT department's influence and power within the firm;

$H2_a$: The Innovativeness of the IT department is positively related to the IT department's influence and power within the firm.

The null hypothesis was rejected. The alternative hypothesis was supported based on a β value of 0.28 and a critical ratio (*t*-value) of 1.95 at the *p*=.05 level of significance.

Customer connectedness. Hypothesis H3 : Customer Connectedness is an antecedent affecting the IT department's influence and power within the firm.

$H3_0$: There is no relationship between Customer Connectedness and the IT department's influence and power within the firm;

$H3_a$: The Customer Connectedness of the IT department is positively related to the IT department's influence and power within the firm.

The test failed to reject the null hypothesis. The alternative hypothesis was not supported based on a β value of 0.08 and a critical ratio (*t*-value) of 1.00 at the *p*=.32 level of significance.

Partnering with other departments. Hypothesis H4 : Collaboration (Partnering) is an antecedent affecting the IT department's influence and power within the firm.

$H4_0$: There is no relationship between Collaboration and the IT department's influence and power within the firm;

$H4_a$: The Collaboration of the IT department is positively related to the IT department's influence and power within the firm.

The null hypothesis was rejected. The alternative hypothesis was supported based on a β value of 0.33 and a critical ratio (*t*-value) of 3.94 at the *p*=.001 level of significance.

IT departments' influence and power and the firm's IT orientation.

Hypothesis H5 : there is a predictive relationship between IT department's influence and power (independent variable) within the firm and the IT orientation (IT savvy) (dependent variable) of the firm.

$H5_0$: There is no relationship between the IT department's influence and power within the firm and the IT Orientation of the firm;

$H5_a$: IT department's influence and power is positively related to the firm's IT orientation.

The null hypothesis was rejected. The alternative hypothesis was supported based on a β value of 0.72 and a critical ratio (*t*-value) of 13.31 at the *p*=.001 level of significance.

IT orientation and business performance. Hypothesis H6 : there is a predictive relationship between the firm's IT Orientation (IT savvy) (independent variable) and the firm's Business performance (dependent variable)

$H6_0$: There is no relationship between the firm's IT Orientation and the firm's Business Performance;

$H6_a$: Firm's IT orientation positively related to the firm's Business performance.

The null hypothesis was rejected. The alternative hypothesis was supported based on a β value of 0.53 and a critical ratio (*t*-value) of 6.37 at the *p*=.001 level of significance.

IT departments' influence and power and business performance.

Hypothesis H7 : there is a predictive relationship between IT department's influence and power (independent variable) within the firm and the firm's Business performance (dependent variable).

$H7_0$: There is no relationship between the IT department's influence and power within the firm and the firm's Business performance;

$H7_a$: IT department's influence and power within the firm is positively related to the firm's business performance.

The null hypothesis was rejected. The alternative hypothesis was supported based on a β value of 0.22 and a critical ratio (t-value) of 3.00 at the p=.00 level of significance.

Hypotheses test results are summarized in Table 26 and Table 27.

Table 26

Summary of the Hypotheses Test Results

Hypothesis	Description	C.R[a]	Supported (Yes/No)
H1	Accountability is positively related to IT department's influence and power.	2.07	Yes
H2	Innovativeness is positively related to IT department's influence and power.	1.95	Yes
H3	Customer connectedness is positively related to IT department's influence and power.	1.00	No
H4	Partnering with other departments is positively related to IT department's influence and power.	3.94	Yes
H5	IT department's influence and power is positively related to firm's IT orientation.	13.31	Yes
H6	Firm's IT orientation is positively related to firm's business performance.	6.37	Yes
H7	IT department's influence and power is positively related to firm's business performance.	3.00	Yes

Note. a = critical ratio

Table 27

Relationship Summary for Research Questions 1 through 3

Research question	Variables	Strength of Relationship N=349		
		β[h]	C.R[j]	Significance
1) What factors shape the IT department's influence and power?	ITDA[a] → ITDINF	0.24	2.07	**
	ITDI[b] → ITDINF	0.28	1.95	**
	ITDC[c] → ITDINF	0.08	1.00	ns
	ITDP[d] → ITDINF	0.33	3.94	***
2) What are the consequences for the firm's IT orientation (IT savvy) and business performance?	ITDINF[e] → ITOR[f]	0.72	13.31	***
	ITDINF → ITBP[g]	0.22	3.00	***
3) How does IT orientation (IT savvy) affect business performance?	ITOR → ITBP	0.53	6.37	***

Notes:

a = accountability, b = innovativeness, c = customer connectedness, d = partnering with other departments, e = IT department's influence and power, f = IT orientation (IT savvy), g = business performance.

h = standardized regression coefficient (weight)

j = critical ratio.

→ = direction of independent variable to dependent variable examined.

** = $p < 0.05$.

ns = non-significant.

*** = $p < 0.001$.

Summary of SEM Analysis and Results

Based on the findings of previous research, this study presupposed that IT departments in firms do not have influence and power and aimed to determine factors which could positively contribute to developing the IT department's influence and power. To that end, four antecedent factors were defined. A research model was developed which described the relationships amongst the antecedents and the IT department's influence and power, IT orientation, and business performance in a nomological network. Observable variables were defined for each latent construct, and data were collected from a Web panel of executives and managers of public and private companies. Structural equation models were developed and tested in a measurement phase and a structural phase using the AMOS software. The following were the salient findings:

1) The traditional goodness of fit index criteria used in SEM analysis indicated that the hypothesized model was a good fit to the sample data after modification to the initial model.
2) The model fit affirmed that the research model was valid: (a) that there are antecedent variables that positively contribute to the development of IT department's influence and power, (b) that the IT department's influence and power positively affect the IT savvy and the business performance of the firm, (c) that the IT savvy of the firm can have a positive effect on the firm's business performance.

3) Notwithstanding the good overall model fit to the sample data, the individual hypothesis predicting the structural relationships showed varied results. While, on the one hand, accountability, innovativeness, and partnering with other departments showed a significant, and positive relationship with the IT department's influence and power, indicated by the path coefficients and the critical ratio value, but, on the other hand, the relationship between customer connectedness and the IT department's influence and power showed positive but not a significant relationship. These findings confirmed the fundamental premise of this research that antecedent factors exist and positively affect the IT department's influence and power.
4) Additional results indicated that IT department's influence and power positively affects a firm's IT orientation (IT savvy) and business performance.

In chapter 5, the implications of these findings for future research and also for professional practice are discussed.

Chapter 5: Discussion, Conclusions, and Recommendations

Overview

This chapter is composed of four main topics. First, an overall discussion of the model results is presented. Second, the contributions of this dissertation to the academic literature and professional practice are examined. Third, the limitations of this study are addressed. Finally, the directions for future research are outlined, and concluding remarks are offered.

Summary

This dissertation aimed to develop a model of the determinants of IT departments' influence and power within firms. To further contextualize the influence and power construct at the organizational level, this study also tested whether IT departments offered any benefit to organizations by way of positively affecting the firms' IT orientation (IT savvy) and business performance. The research model and hypotheses were developed based on the strategic contingencies, resource dependence theories, and empirical evidence in organization and management literature. The research model was tested using structural equation modeling procedures. Overall, the findings support the assertion that several antecedent variables, along with firm-specific factors, contribute to IT departments' relative level of influence and power in organizations. The findings also suggested that the IT department's influence and power has a direct positive effect on the firm's IT orientation (IT savvy) and the firm's business performance. Based on these findings, it is feasible that leaders of

IT departments can intentionally vary their relative influence and power within the firm by sharpening the behaviors suggested by the antecedents. By varying their influence and power in a positive direction the IT leaders can bring firm-level benefits through increased IT savvy and business performance.

As stated in chapter 1, previous research (e.g., Saunders & Scamell, 1986) studied the relative influence level of the IT department within firms and concluded that it was low. Additionally, theory-based intra-organizational research focused on whether or not the IT department had influence and power. According to Hinings, Hickson, Pennings, and Schneck (1974), “different subunits will travel different routes to power at different times, as the circumstances in and around organizations change” (p.42). Saunders (1981) argued:

> “Many departments whose operations are not directly facilitated would not expect to derive additional power from system use, and these departments may, therefore, view MIS use as a threat to their power. They may fear that their power, relative to the involved departments, will decrease” (p. 441)

Lucas (1984) found that firms viewed information processing departments lacking influence and power to bring about the important decisions within their firms (p. 64). Lucas and Palley (1986) found that the department and plant managers in their study sample “did not find information services as powerful as other departments” (p. 46). Saunders and Scamell (1986) found that the "information services department always received either the lowest or the second lowest rating (numeric rank)" with respect to influence and power (p. 145).

What factors contributed to the low influence level of the IT department was not the focus of studies undertaken in the past. This researcher embarked on filling this gap in understanding. The tenets of strategic contingencies and resource dependence theories were synthesized to develop a new theory that a set of four antecedent variables shape the influence and power of the IT department in a firm.

Seven hypotheses delineated the theory. The antecedents were operationalized with support from contemporary research in organization and management studies, and a survey instrument was developed. Data was collected from 349 informants of public and private firms and analyzed using SEM procedures. Results of the analysis supported the theory: antecedent variables shape the IT department's influence and power.

To further examine the role of the IT department and its influence and power in organizations, another theory was that an influential IT department could have a positive impact on the organization. Results of the analysis supported this theory from three perspectives: (a) an influential IT department can shape the IT savvy of the organization, (b) an influential IT department can affect the business performance in a positive way, and (c) an IT savvy organization can have a positive effect on the firm's business performance. Table 26 and Table 27 in chapter 4 summarized the results of the statistical analysis.

Interpretation of the Findings

Figure 31 shows a simplified structural model depicting the direction and strength of the relationships (path coefficients) between the constructs.

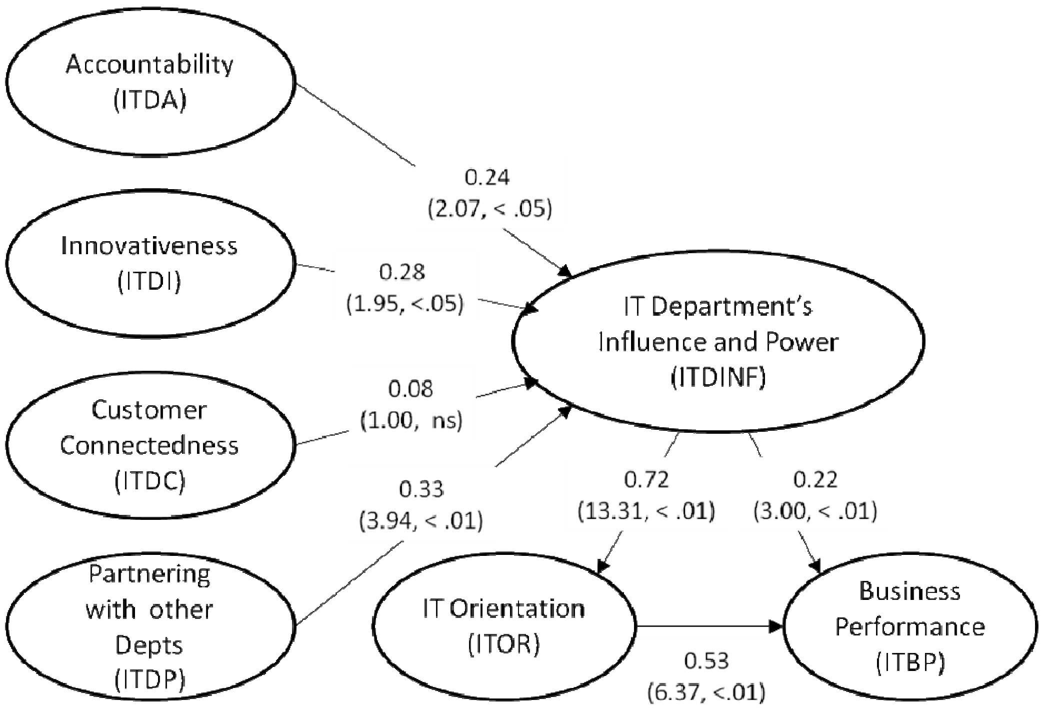

Figure 31 .Simplified structural model: Strength and direction of causal relations. *Note.* numbers shown are standardized path coefficient (β) values. Values in parentheses are the critical ratio, *p*-value, and ns = non-significant.

Six out of the seven hypothesized relationships were supported by the statistical analysis results. Overall it is reasonable to conclude that the IT department's influence and power model examined in this study is theoretically and statistically valid. Accountability, innovativeness, and collaboration (partnering) with other departments are good predictors of the level of influence and power of the IT department within the firm. As indicated by the results of the analysis, collaboration (partnering) with other non-IT departments within the firm is more important ($\beta = 0.33$, C.R = 3.94, $p < .01$) compared to accountability ($\beta = 0.24$, C.R = 2.07, $p < .05$) and innovativeness ($\beta = 0.28$, C.R = 1.95, $p < .05$). High level of collaborating behavior can increase the IT department's participation in problem solving. The non-IT departments feel comfortable seeking the assistance of the IT department which exhibits higher levels of collaborative behavior. This, in turn, increases the opportunities for the IT department to show its consultative behavior through accountability, its innovativeness by proposing new and creative IT solutions. These behaviors and situations can contribute to the TMT's perceptions about the IT department. TMT may feel that the IT department is collaborating with other departments within the firm, is implementing creative IT solutions to solve problems, is helping the non-IT departments become more productive, and is doing all this with a high degree of accountability. The TMT may develop a high level of respect for the IT department which in turn can positively affect the perception amongst others within the firm. These situations can increase the IT department's influence and power.

The high correlations between the antecedents also indicate that accountability, innovativeness, and partnering behavior have a combined positive effect on the IT department's influence and power. High level of accountability means high levels consultative behavior within the firm, which creates opportunities for innovativeness in problem solving, which, in turn, results in high levels of collaboration and communication with other departments. These behaviors can have a positive effect on the TMT's perception about the IT department – that the IT department solves problems, helps other departments, adds value. This perception can also influence the TMT to invite the IT department to contribute to strategic decision situations. In other words, respect at the TMT level can earn the IT department a seat at the CEO's table, so to speak.

The IT orientation (IT savvy) of the firm has a greater positive effect (β = 0.53, C.R = 6.37, $p < .01$), more so than the IT department's influence and power (β = 0.22, C.R = 3.00, $p < .01$), on the firm's business performance as indicated by the strength of the statistical relationships. This is perhaps because, with the combined knowledge of the business processes and the IT systems, the IT savvy users of the non-IT departments within the firm are more adept at exploiting the information communication technologies to their advantage – to do their jobs better, to deliver products and services more efficiently in a timely manner all of which result in a better business performance. On the other hand, an influential IT department alone, without the knowledge of the business, cannot affect the firm's business performance directly. For example, IT savvy finance manager can exploit the enterprise resource planning (ERP) systems to maintain accurate inventory data, process customer invoices faster, and improve the accounts receivable performance by implementing electronic transaction processing. The IT manager, eventhough influential, has to depend on the IT savvy finance manager to implement the IT systems to affect the firm's performance.

Consequently, the IT department's influence and power can affect the business performance directly to a lesser degree than the IT orientation (IT savvy) of the organization. Nevertheless, an influential IT department has a significant, positive effect ($\beta = 0.72$, C.R = 13.31, $p < .01$) on the IT orientation (IT savvy) of the rest of the organization. This indicates that an influential IT department can have a significant positive effect indirectly on the business performance through enhancing the IT orientation of the firm These findings support the notion that an influential IT department is indeed beneficial to the firm.

Analysis results indicated that the customer connecting capability of the IT department does not contribute ($\beta = 0.08$, $C.R = 1.00$, p not significant) to the IT department's influence and power. While the capability to connect with the firm's internal customers – the non-IT departments of the firm – through collaboration, innovativeness, and accountability is positively related to the the IT department's influence and power, the customer connecting capability with the external customers of the firm does not contribute to the IT department's influence and power. One possible explanation for this result is the characteristics of the key informats to this study. Majority of the key informats represented financial and retail industries. In these industries, perhaps it is not common for the IT department of the firm to interact with the external customers of the firm. For example, the IT department manager of a large bank or a retail store does not interact directly with the firms' external business partners. The IT departments in these firms collaborate with their non-IT departments (internal customers) such as the sales department or the marketing department to create IT solutions for solving external customer problems, . For example, the IT department of a bank does not directly collaborate with the endusers (consumers) to determine the features of the automated teller machines (ATM) or to implement the ATMs. Nevertheless, further research is needed to understand the dynamics of customer connectedness and IT department's influence and power.

The following sections present an interpretation of the key findings in support of the research questions.

Research Questions

This section presents the interpretations of the analysis results of the structural equation model in the context of the three research questions confronted by this researcher. The directional relationships (paths) between the variables in this study were specified based on the theoretical considerations drawn from structural contingencies and resource dependence theories combined with empirical research in organization and management literature. Without this theoretical guidance, the fit of the model described and tested in chapter 4 would have capitalized on chance alone.

Research Question 1

The first research question this researcher confronted was, what factors shape the IT department's influence and power within the firm. The theory explored in this study was that there exist four antecedents, and the antecedents have positive effect on the IT department's influence and power. Four hypotheses specified the directional paths between these antecedents and the IT department's influence and power. The notion developed from a synthesis of strategic contingencies and resource dependence theories was that the four antecedents made the IT department pervasive within the firm and pervasiveness resulted in intraorganizational dependence. Pervasiveness and dependence contributed to increasing the influence and power of the IT department. The four antecedents, accountability, innovativeness, customer connectedness, and partnering with other departments are department level behaviors. Drawing perspectives from organizational advocacy and accountability literature, and organization and IT management literature observable variables were developed to operationlize each antecedent. The observable variables were included as scale items in a survey to collect data. SEM analysis results indicated that (a) each antecedent was measurable using three observable indicators, and measurements were reliable and valid as indicated by Cronbach's alpha, AVE, and construct reliability (CR) statistics (see Table 14 and Table 15); (b) all the four antecedents were positively related to IT department's influence and power; (c) three of the four antecedents were good predictors of IT department's influence and power (see Table 26 and Table 27). It is reasonable to conclude that, the theory that, the antecedent variables shape the IT department's influence and power holds.

Research Question 2

While prior research indicated that the IT department did not have influence and power, the current study findings indicated that it is, indeed, possible to increase the IT department's influence and power by way of the antecedents. What can the IT department do with this new knowledge about how to enhance its influence and power? This leads to the second research question, what are the consequences of the IT department's influence and power for the firm's IT orientation (IT savvy) and the firm's business performance. While, in general, influence and power have negative connotations in organizational settings, the IT department's influence and power has a positive consequence for the organization: it has a positive relationship with the IT orientation (IT savvy) and the business performance of the firm. Drawing perspectives from IT management and organization literature, observable variables operationalized the IT orientation and business performance constructs.

The observable variables were included as scale items in a survey and data were collected. SEM analysis results indicated that (a) the IT orientation and business performance were measurable as perceptions using three observable indicators, and measurements were reliable, and valid as indicated by Cronbach's alpha, AVE, and construct reliability statistics (see chapter 4, pp. 233-234, p. 239); (b) the IT department's influence and power was positively related to IT orientation, and business performance; (c) the IT department's influence and power was an excellent predictor of IT orientation, and business performance (see Table 26 and Table 27). It is reasonable to conclude that, the theory that, the IT department's influence and power can shape the IT orientation and business performance of the firm, holds.

Research Question 3

Although an organization may have a high level of IT orientation, it may not be a substitute for the IT department. However, how does the firm's IT orientation (IT savvy) affect business performance? Results of the study indicated that the IT orientation had a greater positive effect on the firm's business performance compared to that of the IT department's influence and power (see Table 26, Table 27, and Figure 31). This indicates that IT savvy firms are better predictors of business performance. The IT savvy non-IT departments have the advantage of understanding both the business and the IT side of the business performance. For example, a sales department with a high level of IT orientation (IT savvy) knows how to exploit the sales information technologies to increase sales revenue. On the other hand, the IT department understands the sales information technologies and can impart knowledge to the sales department and increase its sales information technology orientation. However, the IT department does not necessarily know as well as the sales department regarding how to sell and increase revenue. This is evident from the results of the study (see Figure 31) in that the IT orientation has a greater positive effect on business performance compared to the IT department's influence and power. It is also a reasonable argument that, the IT department has a dual impact on the firm's business performance: directly and through IT orientation of the firm.

Contributions

The current study offers several theoretical contributions. First, this study presents a new theoretical construct, the IT department's influence and power, to examine the organizational implications of the IT department and its leadership. The results of this study fill the gap in the current IT/IS research regarding influence and power of the IT department, which lacks a theoretical basis. Specifically, the current study highlights the importance of the IT department and its contribution that can directly impact the firm's business performance when armed with the appropriate levels of accountability, innovativeness, and partnering with other departments.

Second, the theoretical model and the data analysis results confirm that the strategic contingencies theory of intraorganizational power and the resource dependence perspectives offer a valuable theoretical lens to examine the factors that affect the IT department's influence and power within the firm. The results demonstrated the importance of accountability, innovativeness, customer connectedness, and partnering with other departments, which suggests opportunities for future research.

Third, while the unit of analysis in the majority of IS/IT literature is the information technology artifact or the use of IS/IT devices and software mechanisms in the organization, the current study is among the first examining the antecedents of IT departments' influence and power. Existing research in the domain of IT and management has informed current study in the development of the scale items to measure the IT department's influence and power. The antecedents of IT departments' influence and power have been validated by the data and ready for further and more extensive testing in future studies.

Fourth, this study is the first to use a large-scale field survey approach to test an integrated theoretical model that includes both the antecedents to and the consequences of IT department's influence and power. In fact, the development of a direct measure of the antecedents of IT department's influence and power made it possible to test the explanatory power of the organizational level determinants of influence and power, which complements prior limited work that has examined the IT department's influence and power via environmental proxies (e.g., Lucas, 1984; Saunders & Scamell, 1986) or has examined the antecedents of CIO's decision-making latitude (e.g., Preston et al., 2008).

Although the measures in this study were developed specifically for the IT department, in future research, they could be adapted to measure the antecedents of other departments such as the operations and finance. Further, the current framework could be contextualized to study the influence and power of newly created departments and how to impact the firm's business performance.

Implications

The results of this study offer suggestions to researchers, practitioners, and social change agents. While researchers may examine this study purely from the perspective of questioning the causal claims of this study, on the other hand, practicing managers may view this study as purely academic, and social change agents may not consider that this study has any relevance to positive social change. These issues are addressed in the following sections with some suggestions.

Implications for Researchers

There is a casual connection between the exogenous and endogenous variables in the current research. The model tested in this study offers a causal explanation for the IT researchers and practitioners. Future research will bear out whether such an explanation is valid only if the type of explanation presented in this dissertation has scholarly merit. To that end, two explanatory strategies suggested by Markus (2004) are presented in this section: (a) literal explanation, and (b) non-literal explanation. According to Markus (2004), a *literal* explanation uncovers causation in a process occurring independently of the researcher's affirmation of its existence "indicating that causal claims hold literally true" (p. 178). Stated differently, the *literal* explanation is an argument that "causal models map onto preexisting causal processes: the better the model, the better the causal model represents the causal process" (Markus, 2004, p. 178). A *non-literal* explanation, on the other hand, is an assertion of causation.

If the structural equation model analyzed in this dissertation is considered *causal* based on a *literal* explanation, then the conclusions presented in this chapter are a representation of a causal process at work in the IT department linking the antecedent exogenous variables (accountability, innovativeness, customer connectedness, and partnering with other departments) to the IT department's influence and power, the firm's IT orientation, and business performance. This process operates independently of any causal model or any other representation of the process. For many social and behavioral scientists, this interpretation corresponds to their common-sense view of causal modeling (Markus, 2004).

For a *literal* explanation, a direct effect of the antecedent exogenous variables in the structural equation model can correspond to more than one process. For example, the causal effect of the antecedent variable accountability on the endogenous variable IT department's influence and power may represent a summative effect of accountability with respect to more than one desired outcome (respect at the top management level of the organization and perceptions of other departments within the organization) reflected in a single effect coefficient. Alternatively, the positive effect of accountability associated with just one outcome, say respect at the top management level of the organization, could increase the IT department's influence and power.

In contrast, a *non-literal* explanation would view causation as only an organizing principle of the representation. From a *non-literal* point of view, the model in this dissertation is offered as a causal model only in the sense that it relates the variables causally in an effort to provide a useful means of predicting or shaping the IT department's influence and power, IT orientation, and business performance. However, the causal relationships between the variables in the model do not map onto any relationships outside the model which can be described as causal. The term *causal* applies only within the representing model itself.

Researchers and scholars should judge the model presented in this dissertation on the basis of its usefulness in dealing with the dynamics of influence and power in organizations at the department level, and specifically the IT department, but not on the basis of its fit to any causal processes existing outside this model. Such a *non-literal* explanation provides a middle ground between a *literal* explanation and a purely probabilistic model without any causal content. According to Markus (2004) the basic insight underlying the *non-literal* interpretation holds that people can reason in a fashion understood as causal without assuming any projection of causal properties beyond their reasoning process onto the things about which they reason. This view corresponds to the common-sense view for many cognitive scientists (Markus, 2004).

Implications for Practicing Managers

This study shows a strong position of the IT department. The results of the study clearly suggest that firms should have strong IT departments, because there is a strong link between the IT department's influence and power and firm's business performance. Since the IT department's influence and power is related to IT orientation, which is related to business performance, an influential IT department is beneficial. The IT departments should aim to gain and maintain their influence and power. How to achieve a higher level of influence and power is the question and the results of this study suggest three general solutions: (a) IT departments should become more accountable for the link between IT actions and policies and financial results, evidence of self-examination, and superior internal customer service; (b) IT departments should investigate, and develop new ways of using information communication technologies to improve business processes; (c) the IT departments should develop a strong partnering relationship with other departments within the firm. As shown in Figure 31, these capabilities can produce significant and positive results for the IT department. Although, the current study showed a nonsignificant relationship between the customer connecting capability and the IT department's influence and power (see Figure 31), intuitively if an IT department is knowledgeable about the firm's external customers, and can be readily reached by the external customer to resolve problems, it cannot be a bad thing for the firm. A possible explanation for this weak link is that a majority of the key informants to this study represented the financial, banking, and insurance industry (32%) and perhaps it is not common for customers in this industry to contact their IT departments directly. Perhaps the law and government regulations do not allow such practices due to the nature of information technologies used for financial transactions. As evidenced by the measurement and structural model results, the observed variable "our customers contact our IT department on a routine basis" had the least loading compared to the other loadings, and contributed the least to the explained variance of the IT department's influence and power. Perhaps the IT departments of firms could gain a greater influence and power if they practice a more balanced approach in managing the external customers' expectations and internal perceptions.

Implications for Positive Social Change

While the impetus for this study was to understand the antecedents of IT department's influence and power, the IT department should be considered as an agent of positive social change. According to Avital et al., (2007), positive social change resulting from information technologies requires a consideration of the people living in "underserved communities who might benefit from the right kinds" (p. 584) of information technology support and the viewpoint of the organizations which are proactive in corporate social responsibility. The key findings of this study have implications for positive social change from these two perspectives as discussed below.

The current study results indicate that the partnering behavior of the IT department has a positive effect on the IT department's influence and power. In firms aspiring to practice corporate social responsibility, the IT department may influence the other departments to partake in positive social change. Specifically, while the firm may fulfill its corporate social responsibility by making a monetary contribution, an influential IT department can partner with other departments and exploit its internal partnering capability to partner with external organizations, such as the international nongovernmental organizations (INGO), seeking to improve the wellbeing of underserved people. *Save the Children* is an INGO operating in 40 countries helping children. An influential IT department can utilize its innovativeness to provide information technology tools to improve productivity, to do more with less, and influence the other departments within the firm to help in the children's aid programs.

The current study found that the IT department's influence and power has a significant, positive relationship with the IT orientation (IT savvy) of the firm. An influential IT department through its effect on the IT savvy of the firm can reconstruct the value chain of the firm to include social change components such as the INGO described above.

Limitations of this Research

This study has several limitations. First, this researcher focused on firms in the United States. This indicates the need for a broad, global study that compares and analyzes the IT departments' position across different countries. A second limitation is that this researcher used only self-reported performance, not the actual firm-performance data. In general, the use of self-reported performance data can lead to stronger relationships between constructs (e.g., Cano, Carrillat, & Jaramillo, 2004) such as IT orientation and business performance. A third limitation is the use of anonymous web panel. There is a possibility that there was only one informant per firm. The outcomes of this study would have been more reliable if there were multiple respondents per firm.

Although the survey participants included senior executives of large publicly traded firms, about 30% of the participants were from small firms with or without IT departments in their firms. Further research could try to use a more balanced sample.

The CFA approach led to model modifications by eliminating nonsignificant indicators resulting in a parsimonious model which showed good model fit. However, the refined model was tested using the same sample. This researcher concedes that the model must be tested with a new sample to ascertain the model fit. Finally, cross-sectional survey data is not appropriate for inferring causal relationships and studying organizational dynamics. This is a notable weakness of this study.

Recommendations for Action

An influential IT department can have a significant, positive effect on the firm's business performance. IT leaders should pay attention to how their departments are practicing accountability behaviors, enhancing their innovativeness, and ensuring collaboration with other departments within their firms. Power in organizations has a negative connotation in general. However, this study shows specific, positive outcomes from influence and power both at the department level and at the organization level. At the department level, by increasing its influence and power, the IT department can ensure that the agenda for IT is not set by less knowledgeable non-IT people. At the organizational level, higher levels of IT department's influence and power can produce higher levels of IT savvy and business performance. Department leaders who feel that they cannot affect positive business performance outcomes because of lack of position power must take a more transparent, innovative, and collaborative approach to enhance their influence within their organizations.

Recommendations for Further Study

This study points to several noteworthy new avenues for further research. The importance of accountability calls for further research into how the IT departments of firms might become more accountable. Thus far, IT research scholars have developed multiple models to assess IT's return on investment (e.g., Love, Ghoneim, & Irani, 2004). However, there is a lack of research addressing how IT departments should implement accountability.

Research is also needed on the potential moderating variables that affect the relationship between IT departments' influence and power and the antecedents. Potential moderators might include market turbulence, technological turbulence, economic climate (expansion versus recession), CEO background, firm level choices of business strategy, and technology focus, among others. In the same vein, the moderating variables of the relationships among IT department's influence and power, IT orientation (IT savvy), and business performance should be investigated.

The most important issue for further research pertains to an improved understanding of the interrelationships between the IT department's influence and power and IT orientation (IT savvy). The analysis conducted in this study suggested interplay between these two constructs. Research could focus on how an influential IT department with its own cultural nuances adds to the overall IT oriented culture of the firm, and vice versa. Such a study would require both in-depth qualitative, and longitudinal quantitative studies. An exploratory approach could also be used for further research in which the different manifestations of the IT function with different levels of IT orientation (IT savvy) are investigated using cluster analysis. It would also be relevant to study whether the influence of the IT functions differs between specific industries. Industry might be a moderator of the studied relationships. Based on the evidence presented by this study, regarding factors affecting the IT department's influence and power, one could investigate whether it is possible to avoid power imbalances in organizations.

Although this study focused on the IT department's influence and power, other less powerful departments within the firm can perhaps enhance their influence and power by their own innovativeness, accountability, and working with other departments in a cooperative and consultative manner. This can minimize the power imbalances. The failure of the IT department's influence and power to explain significant incremental variance in business performance beyond IT orientation (IT savvy) needs further research.

Research is needed to understand the dynamics of the IT department's influence and power and the external customers of the firm. This study indicated that the customer connectedness of the IT department does not have a positive relationship with the IT department's influence and power. Although it is possible that the sample data used in this study may have had an effect on the results of the study, this needs further investigation.

Finally, this researcher recommends replication of this study. Surveying respondents from various industries, and analysis of the data for further validation of the survey instrument and the study findings would be beneficial to practitioners. This study has presented a tested questionnaire instrument (see Appendix C). Producing confirmatory follow up research in an iterative process helps to improve continuously, and validate the instrument and the research.

Conclusion

In this study, this researcher investigated the antecedents of the IT department's influence and power. The empirical results showed that the accountability, innovativeness, and partnering with other departments within the firm directly and positively affect the IT department's influence and power within the firm. The study complements prior descriptive studies in IT management and CIO literature. Also, this study provides a framework and sets the stage for future research on the ability of the IT department to impact the business value of the organization.

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Appendix A: Constructs and Corresponding Survey Items

Survey Item	Citation Source
Construct: Accountability	
1. The IT department in my company: • Is effective at linking their activities to financial outcomes. • Shows the financial outcomes of their plans • Periodically audits its own operations as a means to determine its effectiveness inside and outside our company.	Adapted from Moorman & Rust, 1999
• Provides high quality service to internal user community. • Takes ownership and responsibility to solve internal user problems quickly and effectively. • Has great deal of attention for internal user satisfaction.	Constructed Constructed Constructed
Construct: Innovativeness	
2. The IT department in my company:	
• Is considered as highly creative by all the users.	Constructed
• Offers new ideas on how IT can be used to improve business processes to achieve business goals	Adapted from Stratman & Roth, 2002
• Provides new IT tools to our R & D to improve their innovativeness.	Constructed
• Comes up with new and novel ideas to help the users in my department do their job better.	Adapted from Pallister & Foxall, 1998
• Tries out new information technologies.	Adapted from Pennings & Smidts, 2000
• Invents methods for solving problems when an answer is not apparent.	Adapted from Pallister & Foxall, 1998
Construct: Customer Connectedness	
3. In my company: • Our customers contact our IT department directly on a routine basis to get their problems resolved. • Our customer account managers and sales managers invite my company's IT department regularly to attend our current customer meetings. • Our marketing and sales people routinely consult our IT department regarding customer's needs. • Our IT department shows knowledge of how our customers' needs can be taken into account in our company's strategy.	Constructed

(table continues)

Survey Item	Citation Source
Construct: Partnering with Other Departments My Company's IT department, 4. Has an informal working relationship with: Marketing/Sales, HR/Personnel, R&D/Engineering, Manufacturing/Operations, Customer Service, Accounting/Finance 5. Shares ideas, information, and/or resources with: Marketing/Sales, HR/Personnel, R&D/Engineering, Manufacturing/Operations, Customer Service, Accounting/Finance. 6. Works together as a team with: Marketing/Sales, HR/Personnel, R&D/Engineering, Manufacturing/Operations, Customer Service, Accounting/Finance. 7. Conducts joint planning to anticipate and resolve operational problems with: Marketing/Sales, HR/Personnel, R&D/Engineering, Manufacturing/Operations, Customer Service, Accounting/Finance. 8. Achieves goals collectively with: Marketing/Sales, HR/Personnel, R&D/Engineering, Manufacturing/Operations, Customer Service, Accounting/Finance. 9. Develops a mutual understanding of responsibilities with: Marketing/Sales, HR/Personnel, R&D/Engineering, Manufacturing/Operations, Customer Service, Accounting/Finance. 10. Makes joint decisions about ways to improve overall cost efficiency with: Marketing/Sales, HR/Personnel, R&D/Engineering, Manufacturing/Operations, Customer Service, Accounting/Finance.	Adapted from Stank, Daugherty, and Ellinger 1999
Conctruct: IT department's influence and power (ability to influence firm's decisions, perceived power):	
11. In my company, the IT department • Is generally considered to be more important than other departmental functions. • Tends to dominate other functions in decision-making • Is considered to be more influential than other departments	Adapted from Moorman & Rust, 1999
• Always actively participates in and contributes to strategic decision making.	Constructed
• Routinely offers opinions that are valued very much by all the other departments.	Constructed

(table continues)

Survey Item	Citation Source
Construct: IT department's influence and power (Respect at Top Management Level): 12. The top management in my company: • Admits that IT department is critical to our company's success. • Is committed to support the IT department. • Views IT spending as important and strategic investment.	Adapted from Teo & King, 1997
• Thinks that IT department is a ridiculously expensive department.	Adapted from Verhoef & Leeflang, 2009
• Shows indifference towards the IT department. • Considers IT spending as painful but necessary expense to do business.	Constructed Constructed
Covariate: Technological Turbulence: 13. In the industry in which my company operates, • Changes in technology are rapid. • The constant technological changes provide big opportunities. • It is very difficult to forecast where the technology will be in the next two to three years. • A large number of new product ideas have been made possible through technological breakthroughs. • Technological developments are rather minor.	Adapted from Jaworski & Kohli, 1993
Covariate: Market Turbulence: 14. In our kind of business, • Customers' product preferences change quite a bit over time. • Our customers tend to look for new products all the time. • We are witnessing demand for our products and services from customers who never bought them before. • New customers tend to have product-related needs that are different from those of our existing customers. • We cater to many of the same customers that we used to in the past.	Adapted from Jaworski & Kohli, 1993
Covariate: Short Term Emphasis 15. If I were to describe my company's operating philosophy, I would say that it is (check only one): • Short-Term orientation • Long-Term orientation	Adapted from Verhoef & Leeflang, 2009

(table continues)

Survey Item	Citation Source
Covariate: Innovativeness of the firm 16. My Company's Top Management, • Places strong emphasis on research and new product development.	Constructed
• Believes that technological leadership is critical to the success of my company.	Adapted from Verhoef & Leeflang, 2009
• Considers innovations as very important for my company.	Adapted from Verhoef & Leeflang, 2009
• Thinks that the key to my company's success is to sell goods and services that are already well known and proven in the market.	Adapted from Verhoef & Leeflang, 2009
Covariate: Pursued Generic Strategy 17. Please indicate which of the generic business strategies is most applicable to your company: • Cost leadership: strategy to obtain lowest costs in the market.. • Narrow Cost focus: Targeting to meet the lower costs of a specific target market that is cost conscious. • Differentiation focus: Targeting a relatively small segment in the market that desires a unique and good product/service and that is willing to pay a higher price for this. • Broad Differentiation: Focusing on being better in different features of the product/service that are important to customers.	Adapted from Porter, 1980
Covariate: Background of CEO 18. What is the primary background of the CEO of your company? • General management • Finance/Accounting • Information Systems & • Technology • Marketing • Sales • Operations/Manufacturing/Quality • Engineering/Technical • Law • Other	Adapted from Homburg, Workman, & Krohmer, 1999

(table continues)

Survey Item	Citation Source
Construct: Firm's business performance:	
18. Financial Performance: Relative to your Company's stated objectives, how is your Company performing on: • Costs • Sales • Profitability • Market share	Adapted from Moorman & Rust, 1999
19. Customer Relationship Performance: Relative to your Company's stated objectives, how is your Company performing on: • Customer Satisfaction • Customer Retention • Product/Service quality	Adapted from Moorman & Rust, 1999
20. New Product Performance: Relative to your Company's stated objectives, how is your Company performing on: • Financial performance of new product/service development • Speed of new product/service development • Creativity of new product/service development	Adapted from Moorman & Rust, 1999

Survey Item	Citation Source
Covariate: Firm Size	
21. What was the sales revenue of your company for the most recent year? If you do not want to provide an exact figure, could you provide an approximate figure as you recall (e. g., approx. $250M)? Please enter your response in the text box below.	Adapted from Homburg, Workman, Krohmer, 1999
22. What is the approximate total number of full-time employees in your company? If you do not want to provide the exact number, could you state approximately (e.g., approx. 25,000 employees)? Please enter your answer in the text box below.	Adapted from Homburg, Workman, Krohmer, 1999
Covariate: Innovativeness of the firm	
23. To what extent does your business unit emphasize the following activities: • Competitive advantage through superior products • Creating superior customer value through services accompanying the products • New product development • Building up a premium product or a brand image • Obtaining high prices and high profit margins from the market • Pursuing operating efficiencies • Pursuing cost advantages • Pursuing economies of scale	Adapted from Homburg, Workman, Krohmer, 1999

(table continues)

Construct: IT Orientation of the firm	
1. In my company, • Managers and employees are generally technology savvy. • Managers and employees are eager to learn new technology. • IT does not decide what software solutions managers and employees need. • Managers and employees specify the functions and features and select the software solution they need and ask IT department to implement their choice. • Managers and employees are eager to attend software training. • Managers and employees are well aware of information technology solutions available in the market. • Managers and employees believe in information technology solutions for business. • When software training is offered, attendance is generally very poor. • Managers and employees don’t believe they need IT to do their job better.	Constructed
26. What is your age group?	Constructed
27. What is your gender?	Constructed
28. What is your current primary job function?	Constructed
29. Number of years of experience in primary job function:	Constructed
30. What is your current job title?	Constructed
31. What is the industry type in which your company operates?	Constructed

Appendix B: Survey: "IT Department's Role in Organizations"

Construct: IT department's accountability						
1. The IT department in my Company:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Is effective at linking its activities to financial outcomes.	❍	❍	❍	❍	❍	❍
Shows the financial outcomes of its plans.	❍	❍	❍	❍	❍	❍
Periodically audits its own operations as a means to determine its effectiveness inside and outside our company.	❍	❍	❍	❍	❍	❍
Provides high quality service to internal user community.	❍	❍	❍	❍	❍	❍
Takes ownership and responsibility to solve internal user problems quickly and effectively.	❍	❍	❍	❍	❍	❍
Has great deal of attention for internal user satisfaction.	❍	❍	❍	❍	❍	❍
Construct: IT department's innovativeness						
2. The IT department in my Company:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Is considered as highly creative by all users.	❍	❍	❍	❍	❍	❍
Offers new ideas on how IT can be used to improve business processes to achieve business goals.	❍	❍	❍	❍	❍	❍
Provides new IT tools to our R & D to improve their innovativeness.	❍	❍	❍	❍	❍	❍
Comes up with new and novel ideas to help the users in my department do their job better.	❍	❍	❍	❍	❍	❍
Tries out new information technologies.	❍	❍	❍	❍	❍	❍
Invents methods for solving problems when an answer is not apparent.	❍	❍	❍	❍	❍	❍
Construct: IT department's customer connectedness						
3. In my Company:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Our customers contact our IT department directly on a routine basis to get their problems resolved.	❍	❍	❍	❍	❍	❍
Our customer account managers and sales managers invite our IT department regularly to attend our current customer meetings.	❍	❍	❍	❍	❍	❍
Our marketing and sales people routinely consult our IT department regarding customers' needs.	❍	❍	❍	❍	❍	❍
Our IT department shows knowledge of how our customers' needs can be taken into account in our Company's strategy.	❍	❍	❍	❍	❍	❍

(table continues)

Construct: IT department partnering with other departments

4. My Company's IT department has an informal working relationship with:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Marketing/Promotion/Sales	❍	❍	❍	❍	❍	❍
HR/Personnel	❍	❍	❍	❍	❍	❍
Operations/Manufacturing/Quality	❍	❍	❍	❍	❍	❍
Customer Service	❍	❍	❍	❍	❍	❍
Finance/Accounting	❍	❍	❍	❍	❍	❍
New Product Development/R&D/Engineering	❍	❍	❍	❍	❍	❍
5. My Company's IT department shares ideas, information, and/or resources with:	**Never**	**Rarely**	**Somewhat Occasionally**	**Somewhat Often**	**Often**	**Extremely Often**
Marketing/Promotion/Sales	❍	❍	❍	❍	❍	❍
HR/Personnel	❍	❍	❍	❍	❍	❍
Operations/Manufacturing/Quality	❍	❍	❍	❍	❍	❍
Customer Service	❍	❍	❍	❍	❍	❍
Finance/Accounting	❍	❍	❍	❍	❍	❍
New Product Development/R&D/Engineering	❍	❍	❍	❍	❍	❍
6. My Company's IT department works together as a team with:	**Never**	**Rarely**	**Somewhat Occasionally**	**Somewhat Often**	**Often**	**Extremely Often**
Marketing/Promotion/Sales	❍	❍	❍	❍	❍	❍
HR/Personnel	❍	❍	❍	❍	❍	❍
Operations/Manufacturing/Quality	❍	❍	❍	❍	❍	❍
Customer Service	❍	❍	❍	❍	❍	❍
Finance/Accounting	❍	❍	❍	❍	❍	❍
New Product Development/R&D/Engineering	❍	❍	❍	❍	❍	❍
7. My Company's IT department conducts joint planning to anticipate and resolve operational problems with:	**Never**	**Rarely**	**Somewhat Occasionally**	**Somewhat Often**	**Often**	**Extremely Often**
Marketing/Promotion/Sales	❍	❍	❍	❍	❍	❍
HR/Personnel	❍	❍	❍	❍	❍	❍
Operations/Manufacturing/Quality	❍	❍	❍	❍	❍	❍
Customer Service	❍	❍	❍	❍	❍	❍
Finance/Accounting	❍	❍	❍	❍	❍	❍
New Product Development/R&D/Engineering	❍	❍	❍	❍	❍	❍
8. My Company's IT department achieves goals collectively with:	**Never**	**Rarely**	**Somewhat Occasionally**	**Somewhat Often**	**Often**	**Extremely Often**
Marketing/Promotion/Sales	❍	❍	❍	❍	❍	❍
HR/Personnel	❍	❍	❍	❍	❍	❍
Operations/Manufacturing/Quality	❍	❍	❍	❍	❍	❍
Customer Service	❍	❍	❍	❍	❍	❍
Finance/Accounting	❍	❍	❍	❍	❍	❍
New Product Development/R&D/Engineering	❍	❍	❍	❍	❍	❍

(table continues)

9 My Company's IT department develops a mutual understanding of responsibilities with:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Marketing/Promotion/Sales	❍	❍	❍	❍	❍	❍
HR/Personnel	❍	❍	❍	❍	❍	❍
Operations/Manufacturing/Quality	❍	❍	❍	❍	❍	❍
Customer Service	❍	❍	❍	❍	❍	❍
Finance/Accounting	❍	❍	❍	❍	❍	❍
New Product Development/R&D/Engineering	❍	❍	❍	❍	❍	❍

10. My Company's IT department makes joint decisions about ways to improve overall cost efficiency with:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Marketing/Promotion/Sales	❍	❍	❍	❍	❍	❍
HR/Personnel	❍	❍	❍	❍	❍	❍
Operations/Manufacturing/Quality	❍	❍	❍	❍	❍	❍
Customer Service	❍	❍	❍	❍	❍	❍
Finance/Accounting	❍	❍	❍	❍	❍	❍
New Product Development/R&D/Engineering	❍	❍	❍	❍	❍	❍

Construct: IT department’s influence and power - IT Department's perceived power (ability to influence decisions)

11. In my Company, the IT department	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Is generally considered to be more important than other departmental functions.	❍	❍	❍	❍	❍	❍
Tends to dominate other functions in decision making.	❍	❍	❍	❍	❍	❍
Is considered to be more influential than other departments.	❍	❍	❍	❍	❍	❍
Always actively participates in and contributes to strategic decision making.	❍	❍	❍	❍	❍	❍
Routinely offers opinions that are valued very much by all other departments.	❍	❍	❍	❍	❍	❍

Construct: IT department’s influence and power - Respect for IT at the top management level

12. The top management in my Company	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Admits that the IT department is critical to our Company's success.	❍	❍	❍	❍	❍	❍
Is committed to support the IT department.	❍	❍	❍	❍	❍	❍
Views IT spending as important and strategic investment.	❍	❍	❍	❍	❍	❍
Thinks that the IT department is a ridiculously expensive department (reverse scored).	❍	❍	❍	❍	❍	❍
Shows indifference towards the IT department (reverse scored).	❍	❍	❍	❍	❍	❍
Considers IT spending as a painful but necessary expense to do business (reverse scored).	❍	❍	❍	❍	❍	❍

(table continues)

Covariate: Technological Turbulence						
13. In the industry in which my Company operates	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Changes in technology are rapid.	❍	❍	❍	❍	❍	❍
The constant technological changes provide big opportunities.	❍	❍	❍	❍	❍	❍
It is very difficult to forecast where the technology will be in the next two to three years.	❍	❍	❍	❍	❍	❍
A large number of new product ideas have been made possible through technological breakthroughs.	❍	❍	❍	❍	❍	❍
Technological developments are rather minor (reverse scored).	❍	❍	❍	❍	❍	❍
Covariate: Market Turbulence						
14. In our kind of business	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Customers' product preferences change quite a bit over time.	❍	❍	❍	❍	❍	❍
Our customers tend to look for new products all the time.	❍	❍	❍	❍	❍	❍
We are witnessing demand for our products and services from customers who never bought them before.	❍	❍	❍	❍	❍	❍
New customers tend to have product-related needs that are different from those of our existing customers.	❍	❍	❍	❍	❍	❍
We cater to many of the same customers that we used to in the past (reverse scored).	❍	❍	❍	❍	❍	❍

Covariate: Firm’s Characteristics – Short-term emphasis

15. If I were to describe my company's operating philosophy, I would say that it is

- ❍ Short-term Oriented
- ❍ Long-term Oriented

16. My Company's Top Management	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Places strong emphasis on research and new product development.	❍	❍	❍	❍	❍	❍
Believes that technological leadership is critical to the success of my Company.	❍	❍	❍	❍	❍	❍
Considers innovations as very important for my Company.	❍	❍	❍	❍	❍	❍
Thinks that the key to my Company's success is to sell goods and services that are already well known and proven in the market.	❍	❍	❍	❍	❍	❍

(table continues)

Covariate: Pursued generic strategy						
17. Please indicate which one of the generic business strategies is most applicable to your Company:						
Cost Leadership: strategy to obtain lowest cost in the market	❍					
Narrow Cost Focus: Targeting to meet the lower costs of a specific target market that is cost-conscious	❍					
Differentiation Focus: Targeting a relatively small segment in the market that desires a unique and good product/service and that is willing to pay a higher price for this	❍					
Broad Differentiation: Focusing on being better in different features of the product/service that are important to customers	❍					
Covariate: CEO's background						
18. What is the primary background of the CEO of your Company?						
General Management	❍					
Finance/Accounting	❍					
Information Systems & Technology	❍					
Marketing	❍					
Sales	❍					
Operations/Manufacturing/Quality	❍					
Engineering/Technical	❍					
Law	❍					
Other, please specify						
Construct: Firm's Business Performance – Financial performance						
19. Relative to your Company's stated objectives, how is your company performing on:	Much Worse	Worse	Somewhat Worse	Somewhat Better	Better	Much Better
Costs	❍	❍	❍	❍	❍	❍
Sales	❍	❍	❍	❍	❍	❍
Profitability	❍	❍	❍	❍	❍	❍
Market Share	❍	❍	❍	❍	❍	❍
Conctruct: Firm's Business Performance - Customer satisfaction performance						
20. Relative to your Company's stated objectives, how is your company performing on:	Much Worse	Worse	Somewhat Worse	Somewhat Better	Better	Much Better
Customer Satisfaction	❍	❍	❍	❍	❍	❍
Customer Retention	❍	❍	❍	❍	❍	❍
Product/Service Quality	❍	❍	❍	❍	❍	❍

(table continues)

Construct: Firm's Business Performance - New Product Performance 21. Relative to your Company's stated objectives, how is your company performing on:	Much Worse	Worse	Somewhat Worse	Somewhat Better	Better	Much Better
Financial performance of new product/service development	❍	❍	❍	❍	❍	❍
Speed of new product/service development	❍	❍	❍	❍	❍	❍
Creativity of new product/service development	❍	❍	❍	❍	❍	❍

Covariate: Firm Size

22. What was the sales revenue of your company for the most recent year? If you do not want to provide an exact figure, could you please provide an approximate figure as you recall (for example: approx. $250 million)?
23. What is the total number of approximate full-time employees in your Company? If you do not want to provide an exact number, could you please state approximately (for example: approx. 25,000 employees)?

Covariate: Innovativeness of the Firm 24. To what extent does your company/business unit emphasize the following activities:	Not at all	Just a little	Somewhat	A fair amount	A lot	A great deal
Competitive advantage through superior products.	❍	❍	❍	❍	❍	❍
Creating superior customer value through services accompanying the products.	❍	❍	❍	❍	❍	❍
New product development.	❍	❍	❍	❍	❍	❍
Building up a premium product or a brand image.	❍	❍	❍	❍	❍	❍
Obtaining high prices and high profit margins from the market.	❍	❍	❍	❍	❍	❍
Pursuing operating efficiencies.	❍	❍	❍	❍	❍	❍
Pursuing cost advantages.	❍	❍	❍	❍	❍	❍
Pursuing economies of scale.	❍	❍	❍	❍	❍	❍

(table continues)

Construct: IT Orientation of the Firm 25. In my company,	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Managers and employees are generally technology savvy.	❍	❍	❍	❍	❍	❍
Managers and employees are eager to learn new technology.	❍	❍	❍	❍	❍	❍
The IT department does not decide what software managers and employees need.	❍	❍	❍	❍	❍	❍
Managers and employees specify the functions and features and select the software solution they need and ask the IT department to implement their choice.	❍	❍	❍	❍	❍	❍
Managers and employees are eager to attend software training.	❍	❍	❍	❍	❍	❍
Managers and employees are well aware of information technology solutions available in the market.	❍	❍	❍	❍	❍	❍
Managers and employees believe in information technology solutions for business.	❍	❍	❍	❍	❍	❍
When software training is offered, attendance is generally very poor.	❍	❍	❍	❍	❍	❍
Managers and employees don't believe they need IT to do their job better.	❍	❍	❍	❍	❍	❍

26. What is your age group?

❍ Below 31 years
❍ 31 years to 40 years
❍ 41 years to 50 years
❍ 51 years to 60 years
❍ 61 years to 70 years
❍ 71 years and above

27. What is your gender?

❍ Male
❍ Female

28. What is your current primary job function?

❍ Marketing
❍ Engineering
❍ Research & Development
❍ Sales
❍ Finance/Accounting
❍ Operations - Quality Assurance
❍ Operations - Production
❍ Operations - Manufacturing
❍ Other, please specify

(table continues)

29. Number of years of experience in primary job function:
- ❍ 0 - 5 years
- ❍ 6 - 10 years
- ❍ 11 - 15 years
- ❍ 16 - 20 years
- ❍ 21 - 25 years
- ❍ 26 - 30 years
- ❍ Over 30 years

30. What is your Current Job Title? (Please specify)

31. What is the industry type in which your company operates?
- ❍ Aerospace and defense manufacturing
- ❍ Automotive and parts manufacturing
- ❍ Banking
- ❍ Biotech/Pharmaceuticals manufacturing
- ❍ Chemicals manufacturing
- ❍ Computer hardware
- ❍ Computer software
- ❍ Computer/IT services
- ❍ Construction
- ❍ Education
- ❍ Electronics, components, and semiconductor manufacturing
- ❍ Elergy and utilities
- ❍ Engineering services
- ❍ Financial services
- ❍ Healthcare services
- ❍ Insurance
- ❍ Internet services
- ❍ Legal services
- ❍ Medical devices and supplies
- ❍ Retail
- ❍ Telecom services

Other, please specify

Appendix C: Final Survey: "IT Department's Role in Organizations"

Construct: IT department's accountability						
1. The IT department in my Company:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Shows the financial outcomes of its plans.	❍	❍	❍	❍	❍	❍
Periodically audits its own operations as a means to determine its effectiveness inside and outside our company.	❍	❍	❍	❍	❍	❍
Provides high quality service to internal user community.	❍	❍	❍	❍	❍	❍
Construct: IT department's innovativeness						
2. The IT department in my Company:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Is considered as highly creative by all users.	❍	❍	❍	❍	❍	❍
Offers new ideas on how IT can be used to improve business processes to achieve business goals.	❍	❍	❍	❍	❍	❍
Tries out new information technologies.	❍	❍	❍	❍	❍	❍
Construct: IT department's customer connectedness						
3. In my Company:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Our customers contact our IT department directly on a routine basis to get their problems resolved.	❍	❍	❍	❍	❍	❍
Our marketing and sales people routinely consult our IT department regarding customers' needs.	❍	❍	❍	❍	❍	❍
Our IT department shows knowledge of how our customers' needs can be taken into account in our Company's strategy.	❍	❍	❍	❍	❍	❍
Construct: IT department partnering with other departments						
4. My Company's IT department shares ideas, information, and/or resources with:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Marketing/Promotion/Sales	❍	❍	❍	❍	❍	❍
HR/Personnel	❍	❍	❍	❍	❍	❍
5. My Company's IT department works together as a team with:	Never	Rarely	Somewhat Occasionally	Somewhat Often	Often	Extremely Often
Customer Service	❍	❍	❍	❍	❍	❍

(table continues)

Construct: IT department's influence and power - IT Department's perceived power (ability to influence decisions)						
6. In my Company, the IT department	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Routinely offers opinions that are valued very much by all other departments.	❍	❍	❍	❍	❍	❍
Construct: IT department's influence and power - Respect for IT at the top management level						
7. The top management in my Company	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Is committed to support the IT department.	❍	❍	❍	❍	❍	❍
Views IT spending as important and strategic investment.	❍	❍	❍	❍	❍	❍
Covariate: Technological Turbulence						
8. In the industry in which my Company operates	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Changes in technology are rapid.	❍	❍	❍	❍	❍	❍
The constant technological changes provide big opportunities.	❍	❍	❍	❍	❍	❍
It is very difficult to forecast where the technology will be in the next two to three years.	❍	❍	❍	❍	❍	❍
A large number of new product ideas have been made possible through technological breakthroughs.	❍	❍	❍	❍	❍	❍
Technological developments are rather minor (reverse scored).	❍	❍	❍	❍	❍	❍
Covariate: Market Turbulence						
9. In our kind of business	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Customers' product preferences change quite a bit over time.	❍	❍	❍	❍	❍	❍
Our customers tend to look for new products all the time.	❍	❍	❍	❍	❍	❍
We are witnessing demand for our products and services from customers who never bought them before.	❍	❍	❍	❍	❍	❍
New customers tend to have product-related needs that are different from those of our existing customers.	❍	❍	❍	❍	❍	❍
We cater to many of the same customers that we used to in the past (reverse scored).	❍	❍	❍	❍	❍	❍

(table continues)

Covariate: Firm Characteristics – Short-term emphasis

10. If I were to describe my company's operating philosophy, I would say that it is
- ❍ Short-term Oriented
- ❍ Long-term Oriented

11. My Company's Top Management	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Places strong emphasis on research and new product development.	❍	❍	❍	❍	❍	❍
Believes that technological leadership is critical to the success of my Company.	❍	❍	❍	❍	❍	❍
Considers innovations as very important for my Company.	❍	❍	❍	❍	❍	❍
Thinks that the key to my Company's success is to sell goods and services that are already well known and proven in the market.	❍	❍	❍	❍	❍	❍

Covariate: Pursued generic strategy

12. Please indicate which one of the generic business strategies is most applicable to your Company:

Cost Leadership: strategy to obtain lowest cost in the market	❍
Narrow Cost Focus: Targeting to meet the lower costs of a specific target market that is cost-conscious	❍
Differentiation Focus: Targeting a relatively small segment in the market that desires a unique and good product/service and that is willing to pay a higher price for this	❍
Broad Differentiation: Focusing on being better in different features of the product/service that are important to customers	❍

Covariate: CEO’s background

13. What is the primary background of the CEO of your Company?

General Management	❍
Finance/Accounting	❍
Information Systems & Technology	❍
Marketing	❍
Sales	❍
Operations/Manufacturing/Quality	❍
Engineering/Technical	❍
Law	❍
Other, please specify	

(table continues)

Construct: Firm's Business Performance – Financial performance						
14. Relative to your Company's stated objectives, how is your company performing on:	Much Worse	Worse	Somewhat Worse	Somewhat Better	Better	Much Better
Sales	❍	❍	❍	❍	❍	❍

Conctruct: Firm's Business Performance - Customer satisfaction performance						
15. Relative to your Company's stated objectives, how is your company performing on:	Much Worse	Worse	Somewhat Worse	Somewhat Better	Better	Much Better
Customer Satisfaction	❍	❍	❍	❍	❍	❍

Construct: Firm's Business Performance - New Product Performance						
16. Relative to your Company's stated objectives, how is your company performing on:	Much Worse	Worse	Somewhat Worse	Somewhat Better	Better	Much Better
Financial performance of new product/service development	❍	❍	❍	❍	❍	❍

Covariate: Firm Size

17. What was the sales revenue of your company for the most recent year? If you do not want to provide an exact figure, could you please provide an approximate figure as you recall (for example: approx. $250 million)?
18. What is the total number of approximate full-time employees in your Company? If you do not want to provide an exact number, could you please state approximately (for example: approx. 25,000 employees)?

Covariate: Innovativeness of the Firm						
19. To what extent does your company/business unit emphasize the following activities:	Not at all	Just a little	Somewhat	A fair amount	A lot	A great deal
Competitive advantage through superior products.	❍	❍	❍	❍	❍	❍
Creating superior customer value through services accompanying the products.	❍	❍	❍	❍	❍	❍
New product development.	❍	❍	❍	❍	❍	❍
Building up a premium product or a brand image.	❍	❍	❍	❍	❍	❍
Obtaining high prices and high profit margins from the market.	❍	❍	❍	❍	❍	❍
Pursuing operating efficiencies.	❍	❍	❍	❍	❍	❍
Pursuing cost advantages.	❍	❍	❍	❍	❍	❍
Pursuing economies of scale.	❍	❍	❍	❍	❍	❍

(table continues)

Construct: IT Orientation of the Firm						
20. In my company,	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Managers and employees are eager to attend software training.	❍	❍	❍	❍	❍	❍
Managers and employees are well aware of information technology solutions available in the market.	❍	❍	❍	❍	❍	❍
Managers and employees believe in information technology solutions for business.	❍	❍	❍	❍	❍	❍

21. What is your age group?
- ❍ Below 31 years
- ❍ 31 years to 40 years
- ❍ 41 years to 50 years
- ❍ 51 years to 60 years
- ❍ 61 years to 70 years
- ❍ 71 years and above

22. What is your gender?
- ❍ Male
- ❍ Female

23. What is your current primary job function?
- ❍ Marketing
- ❍ Engineering
- ❍ Research & Development
- ❍ Sales
- ❍ Finance/Accounting
- ❍ Operations - Quality Assurance
- ❍ Operations - Production
- ❍ Operations - Manufacturing
- ❍ Other, please specify

24. Number of years of experience in primary job function:
- ❍ 0 - 5 years
- ❍ 6 - 10 years
- ❍ 11 - 15 years
- ❍ 16 - 20 years
- ❍ 21 - 25 years
- ❍ 26 - 30 years
- ❍ Over 30 years

(table continues)

25. What is your Current Job Title? (Please specify)

26. What is the industry type in which your company operates?

- ❍ Aerospace and defense manufacturing
- ❍ Automotive and parts manufacturing
- ❍ Banking
- ❍ Biotech/Pharmaceuticals manufacturing
- ❍ Chemicals manufacturing
- ❍ Computer hardware
- ❍ Computer software
- ❍ Computer/IT services
- ❍ Construction
- ❍ Education
- ❍ Electronics, components, and semiconductor manufacturing
- ❍ Elergy and utilities
- ❍ Engineering services
- ❍ Financial services
- ❍ Healthcare services
- ❍ Insurance
- ❍ Internet services
- ❍ Legal services
- ❍ Medical devices and supplies
- ❍ Retail
- ❍ Telecom services

Other, please specify

Curriculum Vitae

Raghu V. Kowshik

Professional Experience

Flextronics, San Jose, California	
Director, Information Systems	2006-Present
Senior Manager, Customer Integration	2005-2006
Senior Manager, Training & Development	2001-2005
Manager, Corporate Program Management	2000-2001
SE Technologies Inc., San Jose, California	
Software Consultant/Product Specialist	1997-2000
Boeing Defense & Space Company, Irving, Texas	
Supervisor, Supplier Quality Assurance	1995-1997
Supervisor, Engineering Services	1989-1995
Design Liaison Engineer	1986-1989
Geolograph/Pioneer Inc., Oklahoma City, Oklahoma	
Electronics R&D Engineer	1984-1986
Indian Institute of Technology, Bombay, India	
Technical Assistant/Project Engineer	1977-1983
Venson Electronics, Bangalore, India	
Sales Applications Engineer	1976-1977

Teaching Experience

SE Technologies, San Jose, California	
Software Training Consultant	1997-2000
Northlake College, Irving, Texas	
Adjunct Faculty Member, Technology Department	1987-1992

Education

Walden University, Minneapolis, Minnesota	2007-2010
Ph.D.	
Dissertation: A Structural Equation Model of the Factors Associated with Influence and Power of IT Departments and their Relationship to Firm's IT Orientation and Business Performance.	
Texas Christian University, Fort Worth, Texas.	1994-1997
Master of Business Administration	
Bangalore University, Bangalore, India	1974-1976
Post-Graduate Diploma In Industrial Management	
Bangalore University, Bangalore, India	1970-1974
Bachelor of Engineering	
Bangalore University, Bangalore, India	
Bachelor of Science	1967-1970

(continued)

Professional Development:

Six-Sigma Executive Overview, *Flextronics* (2004);
MagicTSD Helpdesk Implementation, *Network Associates, Magic University* (2002); Agile Workplace, Agile ChangeCast Technical Training, *Agile Software Inc* (1999); Siebel 99, "Train the Trainer" Training, *Siebel University* (1999);
Baan IV ERP Software Application Training, *Boeing Defense & Space* (1996); Process Mapping/Business Process Re-engineering, *Boeing/Baan* (1996);
Managing Successful Projects, *Boeing Defense & Space* (1995);
Software Quality Assurance, *Boeing Defense & Space* (1995);
Managing Technical Professionals, *UCLA;*
Engineering Management, *University of Washington;*
First Line Supervisors, *American Management Association;*
Effective Team Building, *Boeing/Zenger Miller;*
Diversity Training, *Boeing;*
Safety and Ergonomics, *Boeing;*
Interviewing Skills, *Boeing*

Affiliations

Association of Computing Machinery (ACM), *Member*

Technical Skills

SOFTWARE: ERP: Baan IV and Baan V Package implementation and support; H*RMS:* Oracle 11.03 HRMS Implementation and Support; *HELP DESK:* Network Associates MagicTSD installation, configuration, implementation, support; *PROJECT COLLABORATION:* Documentum e-Room and SharePoint installation, configuration, implementation, support.

TECHNOLOGY/TOOLS: EDI: ANSI X12 - 850, 855, 860, 856 and 810; RosettaNet - PIP3A4, PIP3A8, PIP3A7, PIP3A9, PIP3B2; *MICROSOFT BIZTALK:* Installation, configuration, RosettaNet Accelerator 2.0, mapping; *TOOLS:* Microsoft Access RDBMS, Crystal Reports, MS Office (Word, Excel, PowerPoint, and Outlook), MS Project, VISIO flowcharting; *OPERATING SYSTEMS:* Working knowledge of UNIX, Windows

PROGRAMMING LANGUAGES: Visual Basic: Working knowledge of Programming in Visual Basic; taught one semester course in Visual Basic 6 at DeVry Institute in Fremont, CA; *WEB:* Working knowledge of HTML and XML as it relates to the implementation of RosettaNet B2B integration.