Relationship between IS Department Strategy, Structure and Performance: A Configurational Approach

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ABSTRACT

Relationship between IS Department Strategy, Structure, and Performance: A Configurational Approach

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Business units within organizations have their own strategies and structures that are not necessarily the same as the organizational ones (Chen et al., 2010). Although the performance of these units contributes to the performance of the organization as a whole, it is not solely reflected by the overall organizational performance. This research focuses on the IS department in order to better understand its environment and characteristics. Specifically, it performs a holistic synthesis of the IS department environment by adopting the configurational approach to investigate the profile of these departments in relation of their strategy, structure, and performance

Over the years, strategy and structure have represented two important constructs that captured the interest of researchers in the business field, and have been investigated in relation to other constructs such as organizational performance. Nevertheless, prior research in this area has been limited to the contingent approach to studying the effect of "fit" between these constructs on performance at multiple levels within an organization.

Various departments in an organization, including the Information Systems (IS) department, have their own strategies and structures. And subsequently, studying strategy and structure within the specific domains or departments of an organization is necessary in order to better understand these constructs at the organizational level.

The purpose of this study is to shed light on the IS departments through exploring their profiles and management practices, and assessing their performance in relation to

their strategy and structure. Grounded in the configurational theory, this research has three main objectives. First, it aims at uncovering emergent configurations formed by the strategy and structure attributes of the IS department. Second, it intends to explore the management practices of the IS departments in relation to the emerging configurations by examining the way through which these departments are managing their IT activities; in this case, the level of outsourcing of various IT activities within the IS department will be considered. And third, this research aims at exploring the IS department performance in relation to the various emerging configurations.

By focusing on the IS department as a unit of analysis, and combining qualitative and quantitative approaches, this study will address an area of research that has not been investigated before. It will enrich the understanding of current IS departments in relation to their strategy and structure and provide a solid ground for future research in this area.

The study has a cross-sectional design and involves primary data collection from business organizations in Canada through four case studies, as well as a nation-wide survey. Based on the results of the four case studies and a rigorous literature review, a survey instrument was developed that assesses IS department strategy, IS department structure, and IS department performance in Canadian business organization. Descriptive analysis was performed to provide an overview of the profile of respondents as well as their respective IS departments. Furthermore, exploratory and confirmatory factor analyses were done to validate the instrument and identify the main attributes of the various constructs under study, and cluster analysis was carried out to form "clusters" of IS departments with similar entities. And finally, ANOVA tests were used to identify differences in IS department performance between various clusters.

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CHAPTER I: INTRODUCTION

1. Context and rationale

Business units within organizations have their own strategies and structures that are not necessarily the same as the organizational ones (Chen et al., 2010). Although the performance of these units contributes to the performance of the organization as a whole, it is not solely reflected by the overall organizational performance. This research focuses on the IS department in order to better understand its environment and characteristics. Specifically, it performs a holistic synthesis of the IS department environment by adopting the configurational approach to investigate the profile of these departments in relation of their strategy, structure, and performance.

Over the years, strategy and structure have represented two important constructs that captured the interest of researchers in the business field, and have been independently and jointly investigated in relation to other constructs such as organizational performance. Chandler (1962) studied the relationship between strategy and structure and reported that organizational structure has to follow organizational strategy, and that strategy changes in response to changes in organizational needs and opportunities (Chandler, 1962). Miles and Snow (1978) also argued that better alignment between strategy and structure would lead to better organizational adaptation, and hence better performance. More recently, Yin and Zajac (2004) presented another perspective, which argues that organizations change their strategies based on their existing structures.

The discussion evolving around strategy and structure and their relationship with organizational performance has always attracted researchers in the past (Chandler, 1962; Miles and Snow, 1978; Rumelt, 1991; Yin and Zajac, 2004). Nevertheless, prior research

in this area has been bound by the contingent approach to the notion of "fit", which was hypothesized to lead to better performance. For example, Rumelt (1991) argued that strategy and structure are not dissociable by demonstrating that performance is not improved by strategy alone, nor by the structure alone, but rather as a result of the fit between the two.

Arguing that the fit between strategy and structure leads to better organizational performance entails a huge leap in this chain reaction, and presents assumptions that might limit the accuracy and reliability of the results obtained. This is due to the dynamic nature of the business environment as well as the existence of number of intervening variables that might interfere with this relationship. For example, on one hand, organizations that have limited fit between organizational strategy and structure might show high levels of performance due to other environmental factors (e.g., low market competitiveness, political stability, economic opportunities, and managerial abilities). On the other hand, organizations enjoying a "perfect fit" between these two constructs might still not achieve good levels of performance due to many internal and external constraining factors (e.g., inappropriateness of their strategy and structure, departmental conflicts, poor human resource assets, high competitiveness, lobbying). Therefore, linking organizational performance to the fit between these two constructs, without considering the natural settings in which they exist, might carry some limitations in relation to the findings obtained. Consequently, further research should explore approaches, other than the contingent one, to study the relationship between strategy and structure and their association with organizational performance.

In 1989, Venkatraman investigated the notion of "fit" in the strategy research area. Venkatraman (1989) dissected the concept of fit and presented different approaches for measuring it based on prior research in the field. He identified six major "fit" perspectives, and argued that prior research have mistakenly used these perspectives interchangeably in their theory building and theory testing. In other words, he argued that previous research has sometimes applied one perspective of fit to test a model that actually adopts a different conceptualization of fit, which might be a major reason for inconsistent results. Table I.1 presents a brief description of Vankatraman's (1989) six "fit" perspectives.

Table I.1: Vankatraman's (1989) perspectives of "fit"

Fit Perspective	Description
Moderation	• The effect of an independent variable on a dependent one is influenced by a third variable called the moderator • The fit between the independent and the moderator variables determines the impact that the independent variable has on the dependent one
Mediation	• Pinpoints to the importance of intervening variables on the relationship between the dependent and independent variables • A mediator variable indirectly affects the relationship between the dependent and the independent variables through directly influencing both of them
Matching	• neglects the criterion or performance measure • Evaluates fit in terms of the match between two variables irrespective of the criterion involved
Gestalts	• Entails the notion of fit among more than two variables • Gestalts are defined in terms of "internal coherence among a set of theoretical attributes" • Conceptualizes "fit" as a consistency among various variable traits
Profile deviation	• Evaluates fit through the adherence to an external predetermined ideal profile • The magnitude of the deviation from the ideal profile determines the degree of fit in the profile examined
Covariation	• considers fit in terms of internal consistencies among the different variables considered

Although researchers have recognized the importance of the concepts of "fit" and "alignment", which was also called fit in the literature (Chan and Reich (2007), between organizational constructs, they have highlighted significant challenges in their identification and measurement (Galbraith and Nathanson, 1979; Venkatraman, 1989; Chan et al., 1997). For example, Galbraith and Nathanson (1979) argued that "Although the concept of fit is a useful one, it lacks the precise definition needed to test and recognize whether an organization has it or not" (p. 266)". Furthermore, Venkatraman (1989) pinpointed that Galbraith and Nathanson's observation still applied in 1989, and proposed the notions of fit presented above to address this issue. More recently, Chan et al. (1997) also highlighted the complexity of the alignment construct and the difficulty associated with its measurement; the author stated that "alignment remains a nebulous concept that is difficult to understand and measure" (p. 126). Sabherwal et al. (2001) argued that the impact of an alignment pattern changes over time and cautioned about claims of the effect of alignment on performance and stated that "claims about performance effects of alignment should be couched in explicitly longitudinal terms" (p.196).

More recently, Chan and Reich (2007) presented arguments that highlight challenges in attaining IT alignment from both research and practice perspectives. Scholarly arguments highlighting challenges in attaining alignment include: 1) the mechanistic nature of alignment and its inability to capture real life; 2) the impossibility of having alignment in the absence or during the construction of a business strategy; 3) lack of desirability to reach alignment by itself given the continuously changing business environment; and 4) the need for IT to challenge the business rather than following it

(Chan and Reich, 2007). Practitioners' perspective on the alignment challenges include: 1) lack of understanding of business and IT strategies by organizational and IT executives respectively; 2) differences in the locus of control and IT status; and 3) infeasibility of a state of alignment in changing organizational environment (Chan and Reich, 2007).

In summary, the relationship between strategy and structure has been and remains a complex one. For this purpose, it is first important to start by simplifying this complex image. Organizations consist of various departments that have their own underlying strategies and structures that define and direct their goals (Miles and Snow, 1978; Broderick and Boudreau, 1991, Chen et al, 2010). Studying the strategy and structure of a specific department and their relationship to the performance of that respective department presents a focused approach to examining the relationship between these constructs in their natural immediate environment and reduces the effect that may be otherwise introduced by intervening variables when considering a higher level unit of analysis such as the organization as a whole.

Specifically, the Information Systems (IS) department represents an important component of organizations today. Yet, limited research has focused on the IS department as a unit of analysis when examining the relationship between strategy, structure, and performance. Given the complexity and interrelationship between these constructs, and in light of the challenges associated with identifying and measuring "fit", one alternative to the contingent perspective of studying the relationship between strategy and structure consists of mapping these constructs at the departmental level to uncover emergent configurations. These configurations will provide a more accurate description of the profile of their respective departments in terms of their strategy and structure.

2. Objectives and research questions

The purpose of this study is to shed light on the IS departments, describe their profiles and management practices, and assess their performance in relation to their strategy and structure. Grounded in the configurational theory, this research has three main objectives.

First, it aims at uncovering emergent configurations formed by strategy and structure attributes of IS departments. These configurations are expected to provide different profiles for IS departments in various organizations. Second, it intends to explore the management practices of the IS departments in relation to the emerging configurations by examining the way through which these departments are managing their IT activities. In this case, the level of outsourcing of various IT activities within the IS department will be considered. And third, this research aims at exploring the IS department performance in relation to the various emerging configurations.

IS departments will be clustered based their strategy and structure attributes. This will produce new typologies that accurately reflect their profiles in terms of these two constructs. The resulting classification can ultimately be used to explore the association between various configurations and the IS department management practices and performance.

The following research questions will be addressed in order to achieve the above three objectives, respectively.

1) What are the different configurations emerging from the mapping of IS department strategy and IS department structure attributes?

2) Are different IS department configurations related to different levels of outsourcing of IT activities by the IS department?
3) What is the relationship between various IS department configurations and IS department performance?

3. Research approach

This research adopts the configurational approach to understand the IS department environment. The underlying logic behind this approach is that the entities take their meaning from the whole (Meyer et al., 1993; Short et al., 2008). As such, various attributes stick together and form a unified whole whose characteristics are more than the sum of those of its constituents. In the context of this research, adopting this approach suggests that various strategy and structure attributes come together to create a unique identity for IS departments. This perspective is specifically suitable in the context of this research since it emphasizes the holistic synthesis as its mode of inquiry and frees the components of the configuration from any linear or causal relationship. Therefore, this approach does not assume that a specific strategy would lead to a certain structure, nor does it suggest that a set of attributes lead to the existence of a respective profile. Instead, it proposes the emergence of different real IS department profiles based on the holistic constellation of strategy and structure attributes.[1]

[1] The Theoretical Framework section presents a complete description of the configurational approach.

CHAPTER II: LITERATURE REVIEW

1. Overview of strategy and structure in organizations

In order to better understand the constructs of strategy and structure at the departmental level, and in light of the limited research studying these two constructs in the context of IS departments, the following sections present an overview of business strategy and organizational structure. This will provide the starting point for this research and guide the development and understanding of the strategy and structure constructs in IS departments.

1.1. Business strategy

1.1.1. Overview of Business Strategy

Uncertainty is a major concern in the business world in which organizations are continuously striving to maximize their profit and minimize their losses. In attempting to do so, they face significant risks that necessitate sound and cautious decision making. In light of this dynamic and complex environment, strategy becomes essential in providing guidelines for business organizations, allowing them to match the level of risks that they face with the available opportunities presented (Kettinger et al., 1994).

Chandler (1962, p.16) is among the first authors who captured the notion of "strategy", and defined it as "the determination of the basic long-term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals". Three years later, Ansoff (1965) further explored this topic in his book "Corporate Strategy" and defined strategy as a company's way of targeting the industry where it operates, choosing a method to proceed in the

search of strategic opportunities, and carrying out its objectives through the help of decisions rules that guide its choices[2].

1.1.2. Business strategy classification

Abundant literature has examined strategy in the organizational context, and significant contributions to the understanding of business strategy have been done over the last decades (e.g., Miles and Snow, 1978; Porter, 1985; Venkatraman, 1989), which shaped the research in this area. In order to better understand strategy and advance research in this area, various efforts to typify business strategy were done where each type of business strategy was regarded as a set of particular characteristics with a common orientation (Ansoff and Stewart, 1967; Freeman, 1974; Porter, 1980; Miles and Snow, 1978). The typology approach is widely used in order to simplify the strategic reality of the organization and make it easier to grasp. In the following sections, two major typologies that have been identified in the literature by Miles and Snow (1978) and Porter (1980) will be presented.

Miles and Snow (1978) identified four major types of organizations based on their strategic orientation: defenders, prospectors, analyzers, and reactors. Defenders are organizations that focus on efficiency and improving their current operations (Miles and Snow, 1978). Organizations falling in this group invest in their narrow market without considering other markets or environments; their attention is mainly directed towards improving their current operations and increasing their profit (Miles and Snow, 1978). They are usually characterized by a rigorous hierarchal structure and tend to favor centralized decision making frameworks (Miles and Snow, 1978). As such, they are prone to high risks in case of a major innovation or "market shifts" whereby any key

[2] For a complete description of Ansoff's components of strategy, please refer to Ansoff (1965) page 108.

change in the organizational environment would reduce the advantages that the defender relies on (Miles and Snow, 1978). Defenders are absolutely appropriate as long as "the world of tomorrow is similar to today's world" (Miles and Snow, 1978).

Prospectors represent organizations that focus on continuous search for new markets and opportunities for growth. Most of their investments are directed toward targeting external markets and reaching a wide range of customers (Miles and Snow, 1978). They continuously consider new products and innovations, are characterized by low degrees of hierarchy, and hence support decentralization of decision making (Miles and Snow, 1978). The major risk they face is through "cost inefficiencies and resource over extension"; as such, scarcity of resources acts as an important threat to prospectors (Miles and Snow, 1978).

Analyzers, falling somewhere in between the two previous types of organizations, divide their investments over moderate improvement of their current operations and reasonable search for new venues (Miles and Snow, 1978). They usually undergo steady growth while favoring a hybrid of centralized and decentralized decision making process, as well as horizontal and vertical structures (Miles and Snow, 1978).

Last, reactors are organizations that do not have a clear systemic strategy and follow the market in their investments (Miles and Snow, 1978). These organizations are usually unstable and perform badly, and hence face continuous threat of bankruptcy (Miles and Snow, 1978).

The second business strategy typology was proposed by Porter (1980) who identified five major competitive forces that organizations face, which cumulatively affect organizational performance and profitability: potential entrants, buyers, suppliers,

substitutes, and industry competitors. In order to cope with these competitive forces, organizations usually adopt one of three major strategic approaches: overall cost leadership, differentiation, and focus strategic approaches (Porter, 1980).

As the name indicates, the overall cost leadership strategy focuses mainly on cost efficiency; the major concern for organizations adopting this strategy type is being ahead of competitors in terms of production costs (Porter, 1980). In order to achieve this state, organizations are usually forced to initially invest in expensive efficient machinery, which would eventually place them in a very strong position with respect to buyers and other competitors (Porter, 1980). In fact, since these organizations operate at low production cost, they can offer buyers extremely competitive prices, while still making profit (Porter, 1980).

Differentiation is a strategic orientation in which the organization is mainly concerned with distinguishing itself from its competitors (Porter, 1980). This differentiation can take any form that the industry and customers value, ranging from brands and technology to marketing and customer service (Porter, 1980). This differentiation strategy provides firms with high returns in light of its low price sensitivity, whereby customers do not compare prices when buying since they know that they are after something that is beyond price savings and is unique to a specific firm (Porter, 1980). Customer loyalty and lack of other resources for customers (e.g., barriers to exit) are the main two poles that support this strategy and ensure its survival and high returns (Porter, 1980).

Finally, the focus strategy aims at segmenting the market and distinctively serving a specific fragment (Porter, 1980). The main rationale of organizations adopting this type

of strategy is that, by focusing on a single segment, they can excel in fulfilling the needs of that group (Porter, 1980). Firms adopting this type of strategy are only concerned with pleasing their target market.

Both typologies present strategy as a way through which organizations cope with their business environment through the adaptive cycle (Miles and snow, 1978) as well as the five competitive forces (Porter, 1980). Furthermore, the strategic types presented by both typologies are similar in core. For example, on one hand, Miles and Snow's defenders as well as Porter's low cost strategy adopters focus on efficiency in operation and are dominated by an internal deep orientation. On the other hand, prospectors and firms that have a differentiation strategy, favor growth and innovation in their operations with emphasis on wide and broad orientation. Furthemore, both typologies highlight the complexity of the strategy construct, and emphasize its importance when examining the management practices and performance of organizations.

1.2. Organizational structure

1.2.1. Overview of organizational structure

Interest in organizational structure dates back to the early 1960s when Chandler (1962, p.16) defined it as the "design of organization through which the enterprise is administered". Organizational structure plays a major role in determining the locus of authority for each position within an organization, and hence is critical in the configuration of the organizational resources (Hall and Saias, 1980). It has been abundantly studied in the literature in relation to organizational strategy, supply chain management, performance, innovation, etc. (e.g., Mintzberg, 1979; Green et al, 2005; Kim, 2007, Liao, 2007; Williams and Rains, 2007).

1.2.2. Organizational structure classification

In 1979, Mintzberg described five major types of organizational structure: simple structure, machine bureaucracy, professional bureaucracy, divisionalized form, and adhocracy. Given the significance of Mintzberg's work in the organizational structure literature, this classification has been extensively adopted by subsequent researchers in the field (e.g., Miller, 1986; Tavakolian, 1989; Brown and Magill, 1994). An overview of the five major types of organizational structure proposed by Mintzberg (1979) is presented in the following sections.

Simple structure is a type of organizational structure that is most commonly observed in young and small organizations (Mintzberg, 1979). It is characterized by low levels of hierarchy accompanied with a dynamic and organic environment, yet with a highly centralized framework (Mintzberg, 1979). The chief executive officer (CEO), who overlooks all major strategic decisions, possesses the power in organizations with this type of structure (Mintzberg, 1979). Hence, the existence of the whole organization is dependent on one individual, which makes this structure the most risky among all five (Mintzberg, 1979).

Machine bureaucracy structure is usually found in mature and large organizations (Mintzberg, 1979). In this type of structure, standardization is the key component, whereby the work processes have to follow a routine and formal route of authority and responsibility in an attempt to decrease or eliminate uncertainty (Mintzberg, 1979). High level managers exhibit the locus of power and strategic decision making in organizations with this type of structure, which is most suitable in stable environments where standardized procedures are feasible (Mintzberg, 1979).

Professional bureaucracy structure exists in complex and yet stable environments, where professionals within the organization determine the core operations by following difficult but well defined procedures (Mintzberg, 1979). This type of structure emphasizes on the standardization of skills and operations, while following a bureaucratic and decentralized vertical and horizontal structure (Mintzberg, 1979). In this case, professional workers are the source of organizational power (Mintzberg, 1979).

Divisionalized form represents the horizontal diversification of products and services to various divisions within the organization (Mintzberg, 1979). It is most commonly observed in large and old organizations where numerous divisions exist. This structure suits simple and stable environments, and is characterized by the standardization of outputs and the importance of performance parameters (Mintzberg, 1979). The headquarters give the organizational divisions control over their respective operations while keeping the final authority in their hands (e.g., they provide the financial resources and monitor the performance of each division) (Mintzberg, 1979).

Last, adhocracy structure typically exists in young firms where the formation of organizational structure is still at its earliest stages (Mintzberg, 1979). Its main theme revolves around innovation, and is characterized by an organic, dynamic, and complex environment with low standardization of procedures and high levels of job specialization (Mintzberg, 1979). Organizations with adhocracy structure have very little formalization, which encourages innovation, as well as mutual adjustment between various teams representing the main coordinating mechanism (Mintzberg, 1979).

Despite the differences between these various types of structure, Mintzberg (1979) argued that organizations might pass through all of the above structures; the one

that would dominate will eventually dictate its characteristics over the organization (Mintzberg, 1979).

Other researchers grouped organizational structural types into three main categories (centralized, decentralized, and hybrid structures) based on the degree of centralization within organizations (King, 1983). For example, King (1983) identified three major dimensions for the centralization / decentralization categorization in organizations: 1) the control dimensions, 2) the physical location dimension, and 3) the functional dimension.

First, centralization of control focuses on the "locus of the decision-making activity in the organization" (King 1983). As such, an organization with centralized control is one which entails a narrow locus of authority that is limited to one or a very small group of individuals (King, 1983). Conversely, decision-making rights in a decentralized organization are spread throughout the whole organization and occur at various hierarchical levels (King, 1983).

Second, centralization of physical location refers to the geographical presence of organizational facilities (King, 1983). Organizations with centralized physical location have all their facilities within the boundaries of the organization, whereas organizations with decentralized physical location have their facilities geographically dispersed (nationally or internationally) (King, 1983).

Third, centralization of function reflects the position of the organizational functions within the whole organizational structure. An organization with centralized functions will have all departments report their data of a specific function to a central unit, which in turn would be responsible for that respective function. In contrast, an

organization with a decentralized function structure will have various scattered departmental centers that deal with their respective functions.

Despite the variation between the typology proposed by Mintzberg's (1979) and the centralized – decentralized classification, similarities exist between the two. For example, simple structures are comparable to centralized structures, and adhocracy structures are similar to decentralized structures. Machine bureaucracy, professional bureaucracy and divisionalized structures are similar to the hybrid structure with more emphasis on centralization on one hand (machine bureaucracy) and decentralization on the other (divisionalized). Therefore, although various approaches have been proposed for measuring organizational structure, they seem to converge on the fact that it represents the way for arranging formal conduct within the organization.

1.3. Relationship between business strategy and organizational structure

1.3.1. History of the relationship between strategy and structure

The discussion and debate over strategy and structure date back to the early 1960s, when Chandler (1962) studied the factors that affected how four major organizations in the U.S. (Du Pont, General Motors, Jersey Standard, and Sears) respond to various organizational needs and opportunities. He further investigated the relationship between changes in strategies that these organizations adopted and the resulting organizational structure. First, he found that needs and opportunities are the main reasons for changes in the organizational strategic orientation (Chandler, 1962). And second, he observed that organizations change their existing organizational structure based on changes in their respective business strategy; as such, "structure follows strategy" leading to a hierarchy between the two (Chandler, 1962). This final note of structure following

strategy opened the door for extensive, ample, and on-going debate among researchers who had different perspectives on this matter.

For example, Ansoff (1965), who agreed with Chandler (1962), indicated that the administrative structure is responsible for satisfying the needs that organizational strategy necessitates. Other researchers did not perceive this unidirectional relationship. They rather considered this relationship to be bilateral. For example, Hall and Saias (1980) investigated this relationship and concluded that there is no base for arguing for a dependent relationship between strategy and structure; either one can follow the other in order to create a match between the two and provide organizational efficiency.

Furthermore, in his study of the design school of strategic management, Mintzberg (1990) argued that this school underlies two main premises. The first states that structure follows strategy, while the second is its exact opposite indicating that strategy follows structure (Mintzberg, 1990). He concluded that these two constructs follow each other as the "left foot follows the right", and hence reinforcing the idea that there is no hierarchy between them; and each would follow and lead the other at the same time (Mintzberg, 1990, p.183).

Along the same line, Amburgey and Dacin (1994) were interested in empirically testing the hierarchy between strategy and structure and measured the magnitude of the effect of strategy on structure and vice versa. They found that although strategy had more impact on the determination of structure than the latter had on strategy, structure still does influence strategy suggesting a reciprocal relationship.

Finally, in a study using longitudinal data from more than six thousand restaurants in the U.S., Yin and Zajac (2004) indicated that stores were pursuing strategies that best

fit their existing structures. As such, they argued that organizations seek strategies based on their existing structures.

In summary, previous researchers have provided varying views on the relationship between strategy and structure, and the order through which each follows the other. Nevertheless, they all agreed on the existence of a tight relationship between these two constructs that requires considerable and thorough attention.

1.3.2. Strategy and structure: The "Common Denominator"

The long lasting debate over the hierarchy between strategy and structure distracted the attention of researchers from other aspects of this relationship, as identified by Chandler's (1962) himself. Although Chandler's (1962) main finding was that "structure follows strategy", he nevertheless drove the attention to shared characteristics between strategy and structure that he called "common denominator" (Chandler, 1962 p. 476). According to the author, this intersection between strategy and structure is responsible for the application of organizational resources in response to market demands (Chandler, 1962).

The "common denominator" concept in the strategy and structure research is critical to examine given its importance in shaping the organizational identity and guiding the decision-making process. Along Chandler's (1962) notion of common denominator, Miller (1986) argued that while strategy attributes merge together to form strategy configurations and structure attributes unite in structure configurations, these two configurations (strategy and structure) are "interlinked" through "ties" that unite them

together. More importantly, he highlighted that studying and uncovering various strategy-structure configurations represents an important area for future research[3].

2. Strategy and structure in the context of information systems

Prior research that examined the constructs of strategy and structure in relation to IS focused on IS strategy and IS structure in the context of business organizations. Nevertheless, no prior study has specifically examined the strategy and structure of IS departments, nor investigated the relationship between them at the department level. Therefore, the following sections present an overview of the existing literature on IS strategy and IS structure in light of the limited information available on IS department strategy and structure.

2.1. Information systems (IS) strategy

2.1.1. Overview of IS strategy

In order to study and evaluate the importance of IS strategy, it is first important to understand its underlying conceptualization and dimensions. Prior research has used the term "IS strategy" to refer to a set of IT activities realized to achieve an organizational goal, without any specific emphasis on the IS department per se. This gap in the existing literature in relation to studying the strategy of the IS department is evident through the existing studies in the IS field as indicated in the following sections.

Earl (1989) was among the main scholars to capture the "technology-strategy" relationship. In his book "Management Strategies for Information Technology", he differentiated between three strategic levels in information technology: IS strategy, IT

[3] A detailed description of the configurations proposed by Miller (1986) is presented in the Theoretical Framework chapter, under the section "Applications of the Configurational Approach".

strategy, and Information Management (IM) strategy (Earl, 1989). Variation in the use of these terms was later observed in the literature, as indicated by the various use of each strategy level by researchers to imply different meanings. In the sections below, an overview of the three strategy levels the variation in their use is presented.

First, IS strategy is the strategy that provides the organizational plan of action for technology (Earl, 1989). This type of strategy emphasizes on the "application" side; it focuses on organizational demands from technology and strives to align these requirements with information system developments (Earl, 1989). It provides the blueprint for technology in an organization, and as such, answers the question of "what to do with IT" (Earl, 1989).

Second, IT strategy is related to the "delivery" aspect of technology, and its primary concern lies in technological architectures and standards (Earl, 1989). This form of strategy focuses on the best actions and techniques for providing intended services through technology (Earl, 1989). Hence, IT strategy answers the question of "how do we do [what we should do]" with technology (Earl, 1989).

Third, IM strategy is defined as the "framework which guides how the organization should run IS/IT activities" (Earl, 1989 p.117). It represents a form of strategy that integrates the management concept into the technology-strategy foundation, and provides ways for organizations to manage their IT (Earl, 1989).

Several authors have used these three forms of strategy interchangeably, although implying different meanings, in their quest to understand the association between technology and strategy (e.g. Rackoff et al., 1985; Galliers, 1993; Chan et al., 1997; Henderson and Venkatraman, 1993; Sabherwal et al., 2001). The term "IS strategy" was

used by several authors to imply different dimensions. For example, Rackoff et al. (1985) argued that IS strategy represents any use of IS that aims at creating or maintaining competitive advantage. Sabherwal et al. (2001) specifically linked IS strategy to the strategic management of information systems. And Chan et al. (1997) discussed the concept of "realized IS strategy" to refer to the strategy governing IS investment decisions as well as IS deployment. Therefore, IS strategy was used in the literature to refer to different aspects related to the use, management and investment in IS.

Variation in the use and meaning of the term "IT strategy" was also observed in the literature. For example, Henderson and Venkatraman (1993) argued that "IT strategy", which used to have an internal orientation focusing on IS architecture, processes and skills, should also have an external orientation that focuses on the suitability of the firm in a fast – growing IT environment. Galliers (1993) employed the term "IT strategy" to refer to all strategy formation and implementation issues related to information systems. And Bergeron et al. (2004) used the term IT strategy to indicate "how IT can be used to support strategic objectives and satisfy information needs".

Finally, Chen et al. (2010) conducted a review of leading journals in the IS field and identified three IS strategy conceptions that focus on the IS strategy construct: 1) "IS strategy as the use of IS to support business strategy" (conception 1); 2) "IS strategy as the master plan of the IS function" (conception 2); and 3) "IS strategy as the shared view of IS role within the organization" (conception 3) (Chen et al., 2010, p.239). The authors defined IS strategy as an "organizational perspective on the investment in, deployment, use, and management of IS" and found that the third conception best fits their suggested IS strategy definition. Based on this conception, they proposed a new IS strategic

typology (IS innovator, IS conservative, and undefined). However, it is important to note that the second conception which suggests that "IS strategy is ascribed as a functional strategy rather than an organizational one" (Chen et al., 2010, p. 240) was the one with the highest prevalence in the existing literature, whereby the authors found 27 articles falling under this conception as compared to 20 falling under the first conception and 9 under the third one. Furthermore, Chen et al. (2010) specified that this second conception suggests that the strategy of the IS functional unit may be different from the strategies of the other business units. This further supports the approach adopted in this research project and highlights the importance of considering the strategy of the IS department separately.

Despite the variations in the definitions, conceptualization, and use of the terms IS strategy and IT strategy, the IS literature was enriched by studies that examined IS strategy from various perspectives and using different levels of analysis. These studies focused mostly on two lines of research involving: 1) IS strategy planning and development; and 2) IS strategy alignment. The following sections provide an overview of these studies.

2.1.2. IS strategy planning and development

As early as the 1970's, interest in examining the concept of IS strategy emerged, and several researchers started exploring IS strategy in relation to business strategy. King (1978) identified the "MIS strategic planning process" as a link between IS strategy and the organizational strategy. He argued that this process is responsible for transforming the organizational strategy and orientation into IS strategy, which corresponds to IS objectives and principles (King, 1978). Therefore, the IS strategy has to follow the

organizational strategy. And the ”MIS strategy set” composed of system objectives, systems constraints, and system design has to be organized according to the organization “strategy set”, which in turn is formed from the organization’s mission, objectives, strategy, as well as other strategic attributes (King, 1978).

King (1978) further indicated that the IS strategy has a direct effect on organizational performance. He highlighted that the traditional “bottom-up” approach to designing IS leads to organizational efficiency, whereas the modern approach considers IS as an organizational decision support system, and hence serve to enhance organizational effectiveness (King, 1978).

The development of IS strategy has gained a lot of attention in recent years due to the complexity, as well as the critical value of this construct to the organizational well-being and goal achievement. As such, various models and frameworks for the development of IS strategy were proposed in the literature (e.g., Levy et al., 1999; Wainwright et al., 2003; Salmela and Spil, 2002).

Levy et al. (1999) investigated various previously suggested framework models and checked their usefulness and applicability in the development of IS strategies in small and medium-sized enterprises. The authors defined frameworks as the “outline models of how IS can potentially fit with firms’ objectives of gaining competitive advantage” (Levy et al, 1999). They used the framework of frameworks, originally developed by Earl (1989), which differentiates between frameworks based on “awareness”, “opportunity”, and “positioning”. Awareness frameworks are those that focus on providing the industry with the way through which IT can create strategic advantage (Levy et al., 1999). Opportunity frameworks direct the firm towards the

identification of suitable strategic opportunities that can be created by IS (Levy et al., 1999). And last, positioning frameworks are frameworks that highlight the importance of available IS for the business in relation to the IS structure, thus emphasizing the relationship between the IS, strategy, and structure domains (Levy et al., 1999). All three types of frameworks emphasize the importance of IS in shaping organizational strategic orientation and structure.

Levy et al. (1999) used four case studies of manufacturing firms in the United Kingdom in order to illustrate the usefulness of each framework in capturing IS strategic opportunities in small and medium-sized businesses. One of the main findings of their study is that the applicability of IS development models is limited to their immediate environment, hence suggesting the existence of a form of interaction between IS strategy and factors of the surrounding environment (Levy et al., 1999). An example of such factors that was highlighted in the study relates to the structure of the small and medium-sized organizations, whereby it was argued that the absence of an IS department and the involvement of senior management in IS purchases could be the reason for poor applicability of the frameworks outside their direct context (Levy et al., 1999). Therefore, the findings of this study highlight the importance of considering the relationship between strategy and structure at the IS department level.

Another research in the area of strategy development was conducted by Wainwright et al. (2003) who noticed that, although the importance of IS strategy has been greatly emphasized and explored in prior research, there is still a great need for uncovering the ways through which this form of strategy is developed. For this purpose, the authors developed the “optimization model” that supports the formation of IS strategy

and identifies areas of potential investments (Wainwright et al., 2003). This model is composed of three main stage processes, each of which has clear and set objectives (Wainwright et al., 2003). It suggests that organizations should start by "auditing" their inputs through mathematical analysis techniques, followed by an "assessment" of the best solutions in light of the given inputs and existing processes (Wainwright et al., 2003). Then, the "selection" stage takes the optimum solutions from the assessment stage, and sends them again to the assessment phase for reassessment, along with the organizational desired objectives. As such, this model transforms the complex long-term orientation of IT investment into three direct short-term evaluations that jointly represent an "integrated whole", and incorporates the organizations' strategic orientation, as it appears in the selection stage (Wainwright et al., 2003).

On a similar note, Salmela and Spil (2002) emphasized on the dynamic nature of IS related issues and argued that the traditional views of IS planning and IS strategy formulation are too static to be adopted in the new business era. In addition, implementing total informal and incremental process plans incurs major risks that present threats for an organization (Salmela and Spil, 2002). The authors introduced the "four cycles" method that aims at providing IS strategy formulation with the formality of the traditional views, as well as the flexibility and continuity of the new trends, hence overcoming the weaknesses of both poles (Salmela and Spil, 2002).

As the name indicates, the "four cycles" method is an approach for developing IS strategy that divides a specific period of time into four cycles (Salmela and Spil, 2002). The first cycle consists of "agreeing on planning objectives", and includes evaluating previous IS planning results, identifying new planning goals, and choosing a new

planning approach (Salmela and Spil, 2002). The second cycle, "aligning business objectives and information objectives", is concerned with revisiting available information resources, analyzing the existing business and technology, and aligning the business and IS objectives; this cycle clearly emphasizes on the importance of examining business strategy and IS strategy jointly (Salmela and Spil, 2002). The third cycle, "analyzing IS resources and IT infrastructure", is composed of the planning of IS infrastructure and IS organization, and evaluating IS development (Salmela and Spil, 2002). Last, the "authorizing actions" cycle identifies the organizational implications and defines the criteria for the decision making process that leads to the authorization of the final decision regarding strategy development (Salmela and Spil, 2002). These four major cycles continuously recur, hence giving more valuable and realistic insights due to the periodic evaluation, as well as the spread of their analysis from one period to the other (Salmela and Spil, 2002).

More recently, Wynn (2009) used Earl's (1989) model for IS strategy development as a framework for evaluating strategy development and implementation in eight case studies in small and medium enterprises (SMEs). In his model, Earl identifies three main approaches to IS strategy development: 1) top-down approach, in which the focus lies on matching IS investments with business needs; 2) bottom-up approach, in which IS strategy is developed based on the organizational current IS capabilities and resources; and 3) inside-out approach, in which IS strategy is built around identifying the opportunities through which IS investments can create competitive advantage for the organization. Wynn (2009) found that the three approaches, proposed by Earl (1989), were valid, and that no single one is better than the others. Furthermore, he found that the

suitability of a specific approach to IS strategy development in SMEs is dependent on the organizational circumstances.

In summary, and based on the previous examples, IS strategy development seems to be a complex, comprehensive, and a continuous process, which is highly dynamic and related to the surrounding environment. Therefore, it is important to explore it in details within its natural setting for a better understanding of its relationship to other constructs.

2.1.3. Alignment between IS strategy and business strategy

Another stream of research wherein IS strategy has gained popularity relates to alignment. Chan et al. (1997 p. 126) defined IS strategic alignment as "the fit between business strategic orientation and IS strategic orientation". The authors considered IS strategy as a mirror of business strategy and proposed a model that links key concepts in this area of research. Their model examines the effect of business strategy, IS strategy, and IS strategic alignment, on perceived IS effectiveness and business performance.

In order to test this model, Chan et al. (1997) developed four instruments measuring the constructs considered in their study, and conducted a mail survey of financial services and manufacturing firms in North America. After data analysis (response rate of 19%), they reported three major findings: 1) three main IS strategic orientations exist in firms, which are "IS support for analysis", "IS support for action", and "IS support for anticipation"; 2) there is a superiority of IS strategic alignment over strategic orientation in predicting IS effectiveness; and 3) a positive influence of business strategic orientation, IS strategic alignment, and IS effectiveness exists on business performance. Finally, Chan et al. (1997) concluded their article by recommending that future studies address various important venues, one of which being the investigation of

ways, other than IS strategic alignment, through which IS strategy can influence IS effectiveness.

In 2001, Sabherwal and Chan also investigated the effect of alignment between business strategy (prospectors, defenders, and analyzers) and IS strategy on firms' performance in order to capture the variation in the effect of alignment on firms with various business strategy types (Sabherwal and Chan, 2001). To ensure a holistic view of alignment, the authors used the profile deviation approach, which relies on theoretical and empirical configurations, to understand relationships between constructs (Sabherwal and Chan, 2001). Through two mail surveys with response rates of 19% and 7%, respectively, the authors were able to find strong support for the effect of alignment on firms' performance among prospectors and analyzers; however, no such relationship was found among defenders (Sabherwal and Chan, 2001).

More recently, and on a similar note, alignment between business strategy and IS strategy was also investigated by Chan et al. (2006). They examined the antecedents of this alignment and tested its effects on performance across various business strategies (prospector, defender, analyzer), and in different industries (business firms and academic institutions). The authors found that the alignment between business strategy and IS strategy is dependent on "shared domain knowledge" and "prior IS success" (Chan et al., 2006). Although the link between alignment and performance was observed across various industries, achieving this alignment varied between industries and among existing business strategies (Chan et al., 2006). More importantly, it was found that, when controlling for business strategy, alignment had a positive effect on performance for prospector and analyzer firms, but not defenders (Chan et al., 2006). This last finding

raised concern among the authors who encouraged future research to investigate this inconsistency between a widespread expectation and reality.

The findings of Sabherwal and Chan (2001) and Chan et al. (2006) raise serious questions about the effects of alignment on performance. It has been long believed that alignment between business strategy and IS strategy leads to better performance. Nevertheless, the findings presented by Sabherwal and Chan (2001) and Chan et al. (2006) show that this causal relationship does not hold, when controlling for the strategic type of the organizations. As such, there is a need for adopting other approaches to studying the relationship between IS strategy and performance. One possible approach lies in examining underlying relationships between IS strategy and other constructs at the department level.

Other recent research that investigated the relationship between business strategy and IS strategy, and its effect on performance, include the work by Cao and Schniederjans (2004) who proposed a conceptual model "e-commerce operations strategy model (ECOSM)" proposing that business environment has a direct effect on operations strategy, which in turn directly influence IS strategic orientation (Cao and Schniederjans, 2004). Furthermore the model suggests that operations strategy, as well as its alignment with business performance and IS strategic orientation, have a direct impact on business performance. Cao and Schniederjans (2004) tested their model through a mail survey of 800 e-commerce companies from various industries in the USA (21% response rate). They found that alignment between IS strategy and operations strategy is directly linked to business performance, and that low performers differ in the way they use their IS strategy as compared to high performers (Cao and Schniederjans, 2004). Furthermore, the

authors distinguished between three types of IS strategies (IS quality strategy, IS flexibility strategy, IS cost and delivery strategy) and reported their effects on various measures of business performance. IS quality strategy was found to have a positive effect on market growth, financial performance, and innovation (Cao and Schniederjans, 2004). However, while IS flexibility strategies showed a direct influence on financial performance and innovation, IS cost and delivery strategies reported no direct effect on any of the performance measures (Cao and Schniederjans, 2004). As such, it is clear that IS strategies focusing on flexibility and quality are associated with high levels of innovation and growth, which are characteristics of the respective "prospector" business strategy. Nevertheless, it is important to further investigate the absence of a direct effect of cost IS strategies on any business performance measure.

Alignment between IT strategy and business strategy was also studied by Lai et al. (2007) who classified companies' IT strategies into three main categories based on three main dimensions: 1) IT importance, which highlights the amount of importance that the company allocates for IT; 2) IT effort, which focuses on the amount of effort that is placed towards IT; and 3) IT involvement, which emphasizes the degree of managerial involvement in IT (Lai et al., 2007). Using cluster analysis, the authors identified three main IT strategy clusters "aligned, technological, and supportive" (Lai et al., 2007). "Aligned" IT strategy focuses on advancing IT and aligning its IT strategy with its business goals by highly emphasizing IT involvement (Lai et al., 2007). "Technological" IT strategy emphasizes IT effort and importance in a way that their main focus falls under IT advancements (Lai et al., 2007). And "supportive" IT strategy mainly emphasizes IT involvement, and uses IT to support its business objectives (Lai et al., 2007).

The use of cluster analysis by Lai et al (2007) presented an interesting contribution to this area of research, which was further complemented by an investigation of the effect of the three IT strategy clusters, among third-party logistics firms in China, on: 1) IT advantage "defined as the degree to which a company's IT capability is better or worse than that of its primary competitors"; 2) firms' competitive advantage measured through the company's relative performance to its primary competitors; and 3) firms' overall financial performance (Lai et al., 2007). The results showed that the "aligned" cluster have higher IT advantage than the "technological" cluster, which in turn have higher IT advantage than the "supportive" cluster (Lai et al., 2007). Nevertheless, financial performance for the "aligned" cluster was found to be better than both of its counterparts (Lai et al., 2007). Furthermore, firms in the "aligned" cluster were found to have higher level of service variety and service quality, two measures of competitive advantage, than firms in the other two clusters (Lai et al., 2007). As such, these findings emphasize again on the importance of alignment between IT strategy and business strategy for superior performance among firms.

It is important to note that, upon examining the items measuring IT involvement, presented in Lai et al. (2007), which is considered as a key indicator of the "aligned" cluster, one can notice that they partly reflect aspects related to structure. IT involvement items that were presented in the survey assess the extent to which "the managers of IT-related departments are involved in company-wide strategic planning" and "the managers of other departments (operations, financial, human resource, etc.) are involved in company-wide IT strategic planning" (Lai et al., 2007). These findings trigger future

research to incorporate the structure dimension, when examining relationships involving IS strategy and performance.

Finally, Chan and Reich (2007) reviewed the alignment literature in IT and found out that there are two conceptualization of alignment that dominated research in this area. The first views alignment as an "ongoing process", whereas the second considers alignment as an "end state". They acknowledged the value of both perspectives, which were considered as important (Chan and Reich, 2007).

In summary research in the alignment area using the contingency approach has been dominating the IS strategy literature in spite of the challenges presented with this approach. Apart from the difficulty in measuring alignment itself (Becker and Gerhart, 1996; Chan and Reich, 2007), the constructs involved (IS strategy and business strategy) are high level constructs and as such, they create extreme difficulty in their monitoring, and more importantly challenges in identifying their alignment. Furthermore, the highly dynamic nature of the business world, especially with the advancement of IT, makes it very hard for organizations to create such an alignment, and to maintain it over a period of time needed for studying its effects.

To date, no prior studies have narrowed down the investigation of strategy to the level of IS departments. In light of the inconsistent findings in the literature on IS strategy and its relationship to performance, as indicated in the previous sections, and the strong association between IS strategy and its surrounding IS environment, it is important to explore alternative approaches for examining these constructs and relationships. Specifically, it is important to examine strategy in the context of IS departments and investigate it in relation to related constructs such as structure. This research provides a

major contribution in this area by focusing on the IS department as a unit of analysis and exploring the relationship between strategy and structure at the IS department level using a configurational perspective[4].

2.2. Information systems (IS) structure

2.2.1. Overview of IS structure

With the advancement in information technologies that are capable of crossing boundaries within and between departments and organizations, a need to revisit and examine the construct of structure in the context of IS and the developing technological organizations has surfaced. As with IS department strategy, limited information is available on IS department structure per se. The term IS structure has been presented in the literature to refer to the way enterprises are organized, which supports the achievement of their objectives at the IS level (Rivard et al., 2004).

In the following sections, an overview of prior studies that investigated IS structure from various perspectives, and using different levels of analysis, is presented. These studies fall under two main groups representing: 1) early views of IS structure; and 2) recent development in IS structure.

2.2.2. Early views of IS structure

Research done from the 1980s until today has increasingly acknowledged the role of IS in rethinking organizational structure due to the association between IS structure and organizational structure (Ein-Dor and Segev, 1982). In order to better understand the technology-structure relationship, various researchers have studied and explored different aspects related to IS structure in the business field. Among the early researchers that

[4] A detailed description of the configurational approach will be provided in Theoretical Framework chapter.

contributed to the development of the traditional view of IS structure are Ein-Dor and Segev (1982), Leifer (1988), Ahituv et al. (1989), and Tavakolian (1989).

Ein-Dor and Segev (1982) investigated the relationship between MIS structure and the organizational structure and found significant "associations between organization structure, as measured by degree of centralization and many aspects of MIS structure" (Ein-Dor and Segev, 1982 p. 65). They considered the "centralization of the decision making process" as a dimension reflecting organizational structure (Ein-Dor and Segev, 1982). MIS structure was perceived as a complex attribute made up of several dimensions including: the "degree of centralization of MIS" (i.e. the extent to which the development and implementation efforts within organizations are centralized); the "degree of integration of MIS" (i.e. data integration within the organization and integration of models whereby outputs of one model act as inputs of another); the "deployment of hardware" (i.e. the physical location of computer hardware within the organization); and the "organizational hierarchy" (i.e. the MIS director's rank within the organization) (Ein-Dor and Segev, 1982).

In the late 1980's and in an attempt to match computer-based information systems (CBIS) with organizational structures, Leifer (1988) divided CBIS into four main types: 1) centralized systems with a central processor / mainframe and "dumb terminals"; 2) distributed systems that involve designed terminals around a central processor / mainframe; 3) decentralized systems with no central processor for communications; and 4) stand-alone systems including stand-alone PCs present in individual departments or information systems in small organizations (Leifer, 1988 p. 64-65). On a similar note, Ahituv et al. (1989) also categorized IS structure into three types based on their hardware

distribution: 1) centralized structure with the computing power located in one site; 2) distributed structure with a common network to which multiple processors in various sites are linked; and 3) decentralized structure with multiple processors not linked through a common network (Ahituv et al., 1989).

Tavakolian (1989) is among the early researchers who cross examined the strategy and structure constructs in a single study, by investigating the relationship between business strategy and IS structure. In his study, Tavakolian (1989) adopted Miles and Snow's (1978) typology for identifying business strategy, and measured IS structure through the locus of responsibility of three major groups of IT activities (systems development and maintenance, systems operations, and systems administration). Through a paired mail survey, the author found that IS structure, and more specifically the degree of centralization of IT activities, is highly related to the business strategy (Tavakolian, 1989). For example, conservative competitive strategy, such as the strategy adopted by defenders, is usually linked to centralized IS structures, while aggressive competitive strategies such as the strategies adopted by prospectors are more associated with decentralized IS structures (Tavakolian, 1989). By cross examining these important constructs at different levels (organizational and IS levels, respectively), Tavakolian (1989) provided insight for future research to go beyond studying strategy and structure at the organizational level.

2.2.3. Recent development in IS structure

More recently, a broader perspective on IS structure emerged with researchers expanding their categorization of IS structure, along the traditional centralized /

decentralized continuum, to account for the evolution of IS in organizations and include a wider range of management and communication domains.

Lee and Leifer (1992) investigated the relationship between IS structure and organizational structure and argued that both have a reciprocal relationship, whereby each affects and is affected by the other. In their study, they highlighted five IS structure dimensions (hardware distribution, locus of application development, database location, planning decision authority, and systems boundary) based on which four main IS structures were identified: centralized, decentralized, hybrid, and inter-organizational systems management (Lee and Leifer, 1992).

First, in centralized IS structure, IT systems have one central processor and a single data center that stores all organizational data (Lee and Leifer, 1992). The IT department is in control of all IT investments, operations, applications, and decisions (Lee, and Leifer, 1992).

Second, in decentralized IS structure, connectivity among various stakeholders is the key issue, whereby each unit shares its own data center with other units through channels of networking and connectivity (Lee and Leifer, 1992). Control over IT is in the hand of its end-users, and decision-making, maintenance, and IT activities are controlled by each department, separately (Lee and Leifer, 1992). The IS department however focuses on long term strategic planning, as well as enhancing and ensuring adequate communication among various end-users (Lee, and Leifer, 1992).

Third, hybrid structure is characterized by having features of both centralized and decentralized structures whereby a central local processor merges the local processors (or smart terminals) of various departments (Lee and Leifer, 1992). End-users are allowed to

develop their own applications but purchases and major decisions concerning IT are controlled by the central unit, which ensures proper and feasible communication among parties to facilitate sharing of data (Lee, and Leifer, 1992).

Fourth, the inter-organizational IS mode goes beyond the organizational boundaries and connects IS systems in different firms. The structure of this mode is case dependent and is determined by the organizations involved (Lee, and Leifer, 1992).

It is important to note that Lee and Leifer (1992) emphasized on the value of alignment between IS structure and organizational structure for information sharing, and highlighted its importance in relation to organizational efficiency and effectiveness. Apart from drawing the attention to the structure constructs (IS structure and organizational structure) and performance measures (efficiency and effectiveness), the authors directed future research towards studies involving smaller units of analysis than the organization, for better exploration of the role of IS structure in organizations (Lee and Leifer, 1992). Specifically, they stated that "unless subunits, departments, or division levels of analysis are used, important distinctions regarding differential IS structures will be lost" (Lee and Leifer, 1992). The current research takes this recommendation into consideration, and targets the IS department as a unit of analysis for the purpose of uncovering emergent IS department configurations based on their strategy and structure attributes, and assessing their relationships with their respective departments' management practices and performance.

Brown and Magill (1994) investigated various adopted designs of IS structures and the organizational rationale (antecedents) for choosing them, and argued that IS structure falls on a continuum between two extreme poles, the centralized and the

decentralized IS structures. Centralized IS structures are those in which the "locus of responsibility (decision-making authority)" is conveyed in a central IS department (Brown and Magill, 1994). Decentralized IS structures allocate the same power to the business unit (Brown and Magill, 1994). Between these two extremes, a "hybrid structure" exists, in which the management of IS is centralized, whereas its use is decentralized (Brown and Magill, 1994). Therefore, IS structure was defined as the firm's overall centralized / decentralized framework for various IS functions related to the management and use of technology (Brown and Magill, 1994). As such, at the time that Lee and Leifer (1992) argued that the IS structure and the organizational structure are two independent constructs that affect and are affected by each other; Brown and Magill (1994) considered the IS structure as an extension of the organizational structure into a the IT domain.

Through a combination of interviews, follow-up survey and a report confirmation of six Fortune-500 companies, Brown and Magill (1994) further identified and discussed four main configurations of antecedents for IT functions design: 1) highly centralized IS structures; 2) highly decentralized IS structures; 3) the choice to change from centralized IS structures to a hybrid one; and 4) the choice to move from a hybrid IS structure into a centralized one (Brown and Magill, 1994). The authors proposed a model based on the four configurations that portray the main antecedents for IS alignment decisions, and concluded that organizations direct their IS structure in a way to align IS functions with the organizational characteristics.

Later in 1996, Fiedler et al. derived a taxonomy of IS structures based on: 1) the centralization of the computer processing; 2) the degree of communication supported by

computers; and 3) the computers' ability for data and application programs sharing. The authors used cluster analysis of data gathered from 313 organizations and identified four IT structures: 1) centralized structures characterized by "centralized processing, low communication, low sharing"; 2) decentralized structures characterized by "decentralized processing, low communication, low sharing"; 3) centralized cooperative structures characterized by "centralized processing, high communication, high sharing"; and 4) distributed cooperative structures characterized by "decentralized processing, high communication, high sharing" (Fiedler et al., 1996 p. 10).

Finally in 2003, Heo and Han adopted Fiedler et al.'s (1996) IS structure taxonomy to develop a similar taxonomy of IS structures in Korea. Through cluster analysis of data gathered from 154 organizations the authors found that the four IS structure taxonomies (centralized, decentralized, centralized cooperative, distributed cooperative) presented by Fiedler et al. (1996) still hold. Furthermore, the authors linked these taxonomies to various measures of IS performance and concluded that systems and information quality are the most appropriate performance measures for organizations having centralized and decentralized computing structures (Heo and Han, 2003). Systems quality and organizational impact are the most suitable measures for firms with centralized cooperative computing structures, whereas organizational impact was most appropriate for firms with distributed cooperative computing structures (Heo and Han, 2003).

In summary, despite the variation in the approaches for studying IS structure by researchers, recent development in this area underscored the importance of examining the structure construct in relation to IS. They went beyond the centralized / decentralized

continuum and focus on physical IT resources to account for the management and communication domains that provide more insight on how IT-related decisions are made, and the extent of connectivity and data sharing between different parts of an organization. In addition, specific emphasis on one dimension of IS structure, "locus of responsibility and decision rights", has emerged in recent years under the IT governance track.

2.2.4. IT governance

IT governance is defined as "specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT" (Weill, 2004). It synchronizes the investments in IT with organizational goals, allocate decision rights, and assign responsibility of action (Weill, 2004).

Initial interest in IT governance originated in the 1970's, when the main focus of researchers evolved around the centralization / decentralization of physical IT resources, such as computers and communication equipment (e.g., Ein-Dor and Segev, 1982; Ahituv et al., 1989). Later on researchers redirected their attention from the distribution of physical resources to the distribution of IT management responsibilities and decision making rights (Sambamurthy and Zmud, 1999; Weill, 2004; and Weill and Ross, 2005).

Sambamurthy and Zmud (1999) grouped the governance modes that have been used in the literature on a spectrum based on the locus of the decision making authority (centralized, decentralized, federal). The authors applied the multiple contingency theory to investigate the way through which various contingency factors affect the organizational choice of a governance mode. In centralized governance modes the locus of control of all IT activities is within the power of the corporate IS managers (Sambamurthy and Zmud, 1999). In decentralized governance modes however, authority

is given to divisional and line managers (Sambamurthy and Zmud, 1999). And federal governance modes are characterized by the division of authority between both corporate and divisional IS managers (Sambamurthy and Zmud, 1999).

The categorization of governance modes used in Sambamurthy and Zmud (1999), which is based on centralization of the locus of decision making, is analogous to the classification used for identifying organizational structure (i.e. centralized, hybrid, and decentralized), and has been used by subsequent researchers in the field. For example, Chin et al. (2004) used this typology to examine the factors affecting the choice of various IT governance structures in organizations growing through mergers and acquisitions. Weill (2004) and Weill and Ross (2005) also studied the decision rights and responsibilities, and presented more elaborate categories along the centralized-decentralized IT governance spectrum.

Weill (2004) and Weill and Ross (2005) identified five major organizational decision fields that fall under the IT governance scope: 1) IT principles, responsible for decisions regarding the organizational role of IT; 2) IT architecture, involving decision rights over technical concerns in achieving organizational goals from IT; 3) IT infrastructure, concerned with acquiring the right infrastructure for using IT as an organizational capability; 4) business application needs, in charge of the business necessities from IT; and 5) prioritization and investment decisions, which allocate decision rights on who and how to invest in IT. The characteristics of each of these five domains guide the allocation and structure of organizational decision rights and responsibilities, that is, the IT governance mode.

Weill (2004) further presented six main IT governance modes (business monarchy, IT monarchy, federal system, IT duopoly, feudal system, and anarchy) that share a continuum of centralization of decision-making. This continuum ranges from a highly centralized IT governance mode at one end (business monarchy) to a highly decentralized IT governance mode at the other end (anarchy) (Weill, 2004). Each of these archetypes or modes can provide the decision rights framework for each of the five decision fields presented above (Weill, 2004). Appendix A presents a detailed description of the five decision domains as well as the six IT governance modes proposed by Weill (2004).

In an attempt to organize the research frameworks accompanying IT governance, Brown and Grant (2005) conducted an extensive review of the literature, and highlighted a comprehensive framework that joins the two main streams of research in this area (IT governance forms and IT governance contingency analysis). According to Brown and Grant (2005), the first stream of research, "IT governance forms", focuses on defining and identifying various IT decision rights structures within the organization along a continuum ranging from centralized to decentralized structures. The second stream of IT governance research, "IT governance contingency analysis", is mainly concerned with identifying best practices with regards to IT governance (Brown and Grant, 2005). The latter focuses on identifying the best governance option for organizations. Researchers in this stream are interested in analyzing various factors (single and multiple) affecting the adoption of a specific IT governance mode (Brown and Grant, 2005). In their work, Brown and Grant (2005) discussed Weill and Ross' (2004) classification, and highlighted its comprehensiveness in combining the previous two streams.

In summary, IS structure represents a broad construct that has been elaborately studied in the literature at different levels of analysis with increasing emphasis on decision rights and accountabilities in relation to the use of IT. Therefore, it is important to acknowledge the role played by the IS department in this context and better understand its structure and the way it shapes its overall performance. To date, no specific research has examined IS department structure, nor investigated its relationship with IS department strategy. In light of the existing literature that recognizes the significance of strategy in relation to IS, and emphasizes on the importance of concurrently examining the constructs of strategy and structure, it is critical to study these two constructs in the context of the IS department and evaluate how they relate to various IS department performance levels.

2.3. Relationship between IS strategy and IS structure

The debate over the relationship between strategy and structure has been carried over to various domains in organizations, including information systems (Table II.1). Nevertheless, this discussion remained at the organizational level, and was mostly concerned with the way IT decisions are made in relation to the business strategy, and the overall structure and management of IT within the organization. No specific attention was made on the IS department per se, and the relationship between strategy and structure in this context.

Table II.1 Major studies investigating the relationship involving the constructs of IS strategy and / or IS structure

	Business Strategy	Business Structure	IS Strategy	IS Structure	Major Findings	Synthesis
King (1978)	√		√		MIS strategy set has to be organized according to organizational strategy set	While king believed that the organizational strategy set can be transformed into an MIS strategy set, Chan et al. (1997) and Chan et al. (2006) argued that business and IS strategies are independent and the alignment between them might lead to better performance.
Chan et al. (1997)	√		√		IS strategic alignment predicts IS effectiveness better than IS strategic orientation. Business strategic orientation, IS strategic alignment, IS effectiveness positively influence business performance.	
Chan et al. (2006)	√		√		Alignment between IS strategy and business strategy had positive effects on performance of prospectors and analyzers, but not on defenders	
Ein-Dor and Segev (1982)		√		√	MIS structure is highly correlated with organizational structure	The authors were in line in the fact that IS structure is characterized by several dimensions, which are similar: 1) Degree of centralization (Lee and Leifer, 1992) vs. planning decision authority (Ein Dor and Segev, 1982); 2) Degree of integration (Lee and Leifer, 1992) vs. locus of application development and database location (Ein Dor and Segev, 1992); 3) Deployment of hardware (Lee Leifer, 1992) vs.
Lee and Leifer (1992)		√		√	Investigated the alignment between business and IS structures	

						hardware distribution (Ein Dor and Segev, 1982); and 4) Organizational hierarchy (Lee and Leifer, 1992) vs. systems boundary (Ein Dor and Segev, 1982). All authors reported an association between IS structure and organizational structure.
Henderson and Venkatraman (1993)	√	√	√	√	Developed the "strategic alignment model" and presented four perceptions of alignment that can in the business world	These three studies were complimentary in a way that Henderson and Venkatraman (1993) discussed the formation of alignment among the four constructs, Sebherwal et al. (2001) discussed the evolution of this alignment over time, and Bergeron et al. (2004) investigated the impacts of their alignment on performance.
Sabherwal et al. (2001)	√	√	√	√	Demonstrated how alignment among the four constructs evolve	
Bergeron et al. (2004)	√	√	√	√	Divergence in co-alignment between the four constructs was accompanied with low-performance	

Several researchers applied the causal logic suggested by Chandler (1962) to information technology, and argued that major IT decisions are made to reflect the business strategy of an organization and how it can be realized through the structure and management of IT (Bergeron et al., 1995; Henderson and Venkatraman, 1993; Sabherwal et al., 2001; Bergeron et al., 2004). By doing so, they emphasized again on the close relationship between the strategy and structure constructs, and highlighted the importance of this relationship in shaping various decisions and activities in which organizations engage. At the level of IS departments, this is translated into the relationship between the strategy and structure of these departments, which will be examined in this research in order to uncover emergent configurations based on the clustering of the attributes of these two constructs.

In the IS literature, fit and alignment are key concepts that have been used to explore the association between IS strategy and IS structure, and investigate the relationship between them. Although no prior study has examined these two constructs solely or at the IS department level, researchers have investigated their relationship in conjunction with other constructs at the organizational level (Henderson and Venkatraman, 1993; Sabherwal et al., 2001; Bergeron et al., 2004), as will be presented below.

Henderson and Venkatraman (1993) developed the "strategic alignment model", which focuses on two major focal points: 1) the "fit" between the external domain (strategy) and the internal domain (infrastructure) of an organization; and 2) the "functional integration" between business and IT. The authors also developed four perceptions of alignment that can be referred to in the business world: "strategy execution

alignment perspective", "technological transformation alignment perspective", "competitive potential alignment perspective", and "service level alignment perspective" (Henderson and Venkatraman, 1993).

The concept of alignment that directed the research of Henderson and Venkatraman (1993) is based on two widely accepted strategy and structure assumptions. The first is that a firm's performance is reflected through the management's role in creating a "fit" between its organizational strategy and structure; and the second is that this "fit" is unstable and in constant evolution based on the organizational engagements, hence rendering "fit" a process rather than a state (Henderson and Venkatraman, 1993). These two underlying assumptions raise some concerns and present a challenge to the concept of "fit". The first assumption (related to creating fit between strategy and structure) assumes that for every strategic type there is a perfect structure that "fits" it, which might not hold in all cases. With respect to the second assumption, the concept of "fit" is considered as a dynamic, continuously changing target, which makes it harder to capture and assess.

In 2001, Sabherwal et al. demonstrated ways of achieving alignment among four constructs: IS strategy, business strategy, IS structure, and business structure. Based on three case studies, and grounded in the punctuated equilibrium theory, the authors argued that organizations pass through periods of evolutions characterized by minor change in the organizational structure, as well as periods of revolutions through which organizational structure undergoes major transformations (Sabherwal et al., 2001). They found that organizational periods of evolution may or may not be accompanied by high

levels of alignment, and revolution periods do not guarantee alignment among the constructs as has been demonstrated in prior research (Sabherwal et al., 2001).

Along the same line, Bergeron et al. (2004), who were the first researchers to investigate co-alignment among the four constructs together (IT strategy, IT structure, business strategy, and business structure), instead of limiting their analysis to the alignment between two of them at a time, empirically tested the effects of fit and co-alignment on business performance in small organizations. Specifically, they highlighted the effect of the relationship between the strategy and structure constructs on firms' performance. Using a mail survey of around 110 small firms in various industries, the authors' were able to categorize the clustering variables (i.e. the four constructs) into (high - H, medium - M, or low - L), and as such cluster them into four distinct groups of organizations. They identified six types of alignment (business alignment, strategic alignment, structural alignment, IT alignment, cross-dimensional alignment 1, and cross dimensional alignment 2), which reflect a two-by-two alignment of the four constructs. And the overall alignment in the four clusters was calculated based on the number of various levels (H, M, and L) of bivariate alignment. Bergeron et al. (2004) found that convergence in co-alignment between the four constructs was accompanied with high-performance whereas divergence in this co-alignment led to low-performance. Nevertheless, one of the groups in this study, which had "non-conflicting alignment", and was hypothesized to be accompanied with high performance, demonstrated low performance. This led the authors to conclude that using "fit" among these constructs to explain performance applies only is cases where "organizations have attained a minimum threshold on all four alignment domains" (Bergeron et al., 2004 p. 1015). In addition to

emphasizing the importance of closely examining the strategy and structure constructs together, this finding further highlights the importance of carefully examining these constructs in their natural settings to further understand the way they interact and how their interaction affects performance.

In summary, previous studies have portrayed the relationship between IS strategy and business strategy (e.g. Sabherwal and Chan, 2001; Chan et al., 2006), and IS structure and business structure (e.g., Ein-Dor and Segev, 1982; Lee and Leifer, 1992). Similarly, relationships between business strategy and organizational structure have been highlighted by various researchers in the field (e.g., Chandler, 1962, Miller, 1986), and the relationship between business strategy, organizational structure, IS strategy, and IS structure has also been explored in the literature (e.g., Henderson and Venkatraman, 1993; Sabherwal et al., 2001; Bergeron et al., 2004). Nevertheless, as presented in Figure II.1, no prior study has focused on the relationship between the two constructs of strategy and structure at the IS department level, nor explored the various configurations that may naturally emerge based on the clustering of the attributes of these two constructs, which better reflect the actual reality in these settings.

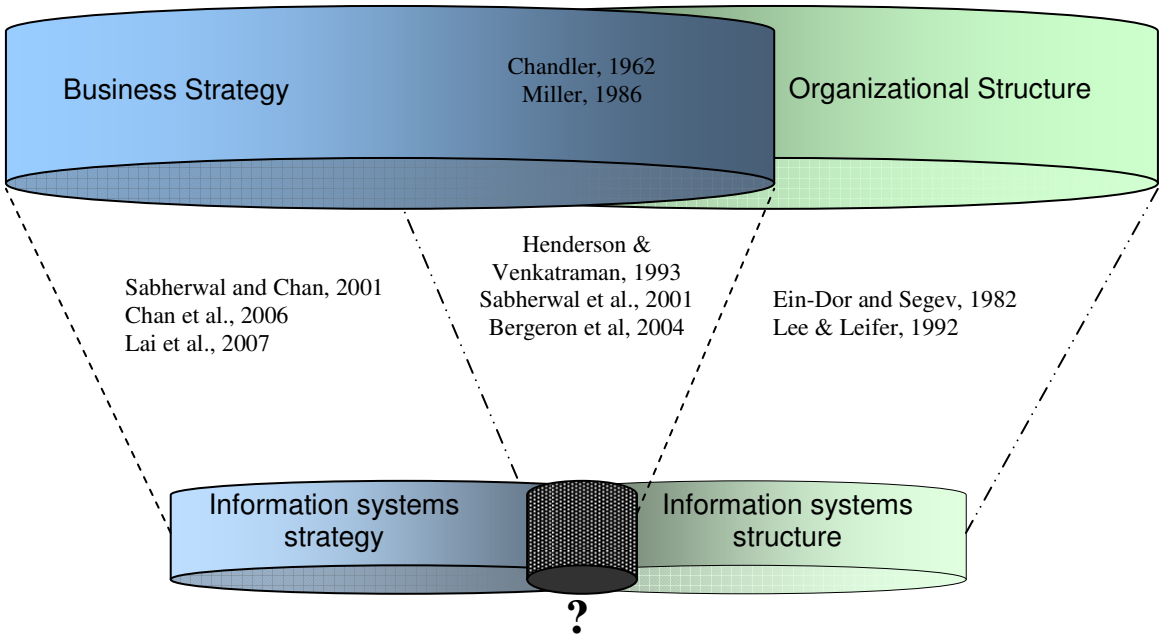


Figure II.1 Overview and illustration of existing areas of research in relation to business strategy, organizational structure, IS strategy, and IS structure

It is important to mention that the relationship between IS strategy and IS structure has not been explored in the literature as elaborately as the relationship between business strategy and business structure. This is primarily due to the focused application of IS strategy and IS structure to the domain of information technology, as opposed to the broader scope of business strategy and business structure in organizations. In addition, the relatively recent evolution and interest in "information systems", especially when compared to the "organizational behavior" and "strategy" disciplines within the business field, explain the lag in research in this area. Nevertheless, in order for the IS field to stand alone and strengthen its position among other areas in the business field, there is a persistent need and great pressure on IS researchers to catch up with other disciplines and conduct research that provide valuable insights from an IS perspective (Baskerville and Myers, 2002; Weber, 2003).

3. Information technology (IT) outsourcing

3.1. Defining IT outsourcing

Outsourcing is a common mechanism that organizations adopt in order to attract expertise at a decreased cost and focus on organizational core activities. It is defined as the "handover of an activity to an external supplier" (Aubert et al., 2004 p. 922), and considered a way for organizations to manage their IT activities. Loh and Venkatraman (1992 p.9) refer to it as the "contribution by external vendors in the physical and/or human resources associated with the entire or specific components of the IT infrastructure in the user organization". As such, IT outsourcing involves the handover of one or more IT-related assets or activities to an external supplier, by contracting or selling, using formal arrangements over a specified period of time (Kern et al., 2002).

Williamson (1985) argues that outsourcing is a critical decision related to structure. As such it is expected to relate to strategy, which makes IT outsourcing an interesting phenomenon to investigate in relation to IS department strategy.

3.1.1. Overview of prior research on IT outsourcing

From the early 1970's, researchers became interested in further investigating this type of management and its economical value to the organization (Dibbern et al., 2004). Subsequently, IT outsourcing has been most extensively studied from an economic perspective in relation to the transaction cost theory (TCT) (Ang and Straub, 1998; Aubert et al., 1996; Aubert et al., 2004; Bahli and Rivard, 2003, 2005).

Researchers adopting the TCT perspective in explaining IT outsourcing argue that organizations practice IT outsourcing when the cost of production of an IT activity outweighs the cost of having it outsourced, including the cost of transaction (Ang and

Straub, 1998). Interest in investigating different aspects related to IT outsourcing (e.g., determinants, risks, success etc.), as well as its relationship with other organizational constructs have been observed in several studies in the literature given the importance of this management practice and its value in explaining variations in the performance of IS departments.

Assessment of the determinants of IT outsourcing represent a major area that attracted researchers in the IS field. Ang and Straub (1998) studied the economic determinants of IT outsourcing from three main angles: production costs, transaction costs, and financial slack. They found that comparative production cost advantages positively affect the degree of IT outsourcing, while high transaction costs have an opposite effect; financial slack however, had no observed effect on the degree of IT outsourcing (Ang and Straub, 1998).

Furthermore, Aubert et al. (2004) investigated the characteristics of IT operations in relation to asset specificity, technical skills, business skills, and uncertainty. They found that the major reason for IT outsourcing lies in the level of technical skills needed to carry on the operation, while uncertainty accompanying the transaction is a key inhibitor of IT outsourcing (Aubert et al., 2004). Asset specificity, a traditional explanation of vertical integration, did not seem to play its expected role in IT outsourcing (Aubert et al., 2004).

Other researchers have been interested in the classification of risks involved in IT outsourcing, and studying the success factors associated with this practice. For example, Bahli and Rivard (2005) identified three major sources of risk that accompany IT

outsourcing operations (i.e. the client, the supplier, and the transaction), and determined the risk factors underlying each of these risk sources.

Lee and Kim (1999) found that there is a clear relationship between partnership quality and the success of IT outsourcing, and Lee (2001) presented strong support for the positive effect of implicit and explicit knowledge sharing on outsourcing success. In addition, Lacity and Willcocks (1998) identified five practices that are linked to the success of IT outsourcing: selective outsourcing; joint decision making between senior executives and IT managers; considering internal as well as external bids to outsourcing; short-term contracts; and detailed fee for service contracts. More recently, Koh et al. (2004) found that the main determining success factor for IT outsourcing relates to fulfilling the obligations between the parties involved in the outsourcing agreement.

The studies presented above are examples of topics that have attracted scholars in the IS field in relation to IT outsourcing. The majority of the previous studies in this area have focused either on the economic perspective of the transaction, or on the associated outcomes. Nevertheless, the strategic nature of outsourcing has not been widely explored, and the variation in outsourcing in relation to the strategy and structure adopted by IS departments has not been previously investigated.

3.1.2. IT outsourcing and strategy

The relationship between overall business strategy as a long term organizational direction and IT outsourcing arise from IT being a resource, capability, and an asset that organizations carefully consider and assess in their long term planning (Wade and Hulland, 2004). Das et al. (1991) are among the researchers who discussed IT outsourcing in relation to strategy. They argued that prospectors prefer to get their

resources from an external source while defenders are more likely to develop their IT internally. As such, IT outsourcing is more likely to be observed among prospectors than defenders.

Furthermore, Grover et al. (1994a) identified four major strategic advantages of IT outsourcing that contribute to its growth and popularity: focusing on core business, focusing on strategic use of IT, enhancing IT competence, and enhancing IS staff expertise. Along the same line, Grover et al (1994b) found that organizational strategy and the role of IT are key factors that influence the relationship between "gaps in IS resources and capabilities" and the "extent of IS outsourcing". Their results highlight the relationship between IT outsourcing and business strategy and indicate that outsourcing is "indeed strategic" (Grover et al., 1994b).

Teng et al. (1995) also examined IT outsourcing in relation to strategy. Specifically, they considered IT outsourcing as a strategic decision that is highly linked to organizational strategy (Teng et al., 1995). Nevertheless, although their hypothesis linking IT outsourcing level to the strategic role of IT (traditional, evolving, and integral) was supported, their hypothesis linking the decision of IT outsourcing to Miles and Snow's organizational strategic types (prospector analyzer, and defender) was not supported. This finding suggests that either IT outsourcing is independent of the organizational strategy type, or that the organizational strategy type might not have clearly portrayed the departmental strategic orientation, or that other factors may exist that interfere in the relationship between organizational strategy and IT outsourcing. The first explanation might not hold given the existing research that associate strategy and IT outsourcing. The second explanation might be more adequate in light of the findings by

Teng et al. (1995) reporting that prospectors do indeed outsource their IT more than organizations with other strategic types, although the difference was not significant enough to support the hypothesis. As for the third potential explanation, it is evident that organizational environments entail various factors that might interfere in the relationship between strategy and IT outsourcing, especially that the strategy construct has been extensively studied and linked to other organizational constructs such as structure.

Another study by Gilley and Rasheed (2000) investigated the relationship between outsourcing and firm's performance as well as the moderating effect of organizational strategy and environment on this relationship. The authors found that IT outsourcing for cost leaders and differentiators is positively related to financial and innovative performance respectively (Gilley and Rasheed, 2000). This finding suggests that IT outsourcing is more popular among organizations that focus on growth and innovation (i.e. prospectors) than among organizations that prioritize efficiency (i.e. defenders).

More recently, Lee et al. (2004) further captured the importance of the relationship between strategy and IT outsourcing by developing a new construct "IT outsourcing strategy". With the underlying logic of realized strategy, which the authors argue is "a pattern reflected in a stream of decisions", they defined IT outsourcing strategy as "the logic visible in a firm's portfolio of IT outsourcing decisions" (p. 112), and emphasized on the strategic nature of this practice. Specifically, the authors investigated the effects of various IT outsourcing strategies on outsourcing success and reported superiority of the configurational approach, which is adopted in this research

proposal, over universalistic and contingency perspectives in explaining outsourcing success (Lee et al., 2004).

Furthermore, Aubert et al. (2008) investigated the relationship between Mile's and Snow's (1978) business strategy typologies and the level and nature of IT outsourcing behavior. Through the analysis of 200 Canadian firms and their outsourcing of seventeen IT activities, the authors found that prospectors and analyzers were more aggressive in the outsourcing of their IT operations than defenders. Furthermore, they found that there was a difference in the outsourcing of maintenance activities and IT operations, whereby the former showed significantly higher outsourcing levels than the latter (Aubert et al., 2008).

In addition, Berg and Stylianou (2009) surveyed 1575 attendees of four SAP conferences, whereby respondents were managers and directors of various organizations that use ERP systems. The authors found that IS outsourcing strategies are aligned with organizational strategies. For example, on one hand, cost considerations were the most critical factors in IS outsourcing decisions among firms that have a low-cost strategy. On the other hand, supplier factors were the primary considerations in IS outsourcing decisions of firms with differentiation strategies (Berg and Stylianou, (2009).

Finally, Willcocks (2010) identified five reasons why IT outsourcing should be present in the organizational strategic agenda. 1) its effect on the market value; 2) its continuous growth; 3) its effect on the corporate health; 4) its ability to play a strategic role; and 5) the bargaining power of the CEO.

In light of the variation in the findings reported above in relation to strategy and IT outsourcing, it is important to explore other factors that may be associated with

various levels of IT outsourcing. The IS department strategic orientation in relation to IT outsourcing, as well as the internal organization of the IS department are factors that may affect the level of IT outsourcing. At present, limited evidence exists on the relationship between IT outsourcing, strategy, and structure at the IS department level. IS departments with different strategies and structures may engage in various levels of outsourcing of IT activities, which would illustrate differences in their management practices based on these two constructs. This research addresses this issue by examining the relationship between various emergent (based on strategy and structure attributes) IS department configurations and the level of outsourcing of major IS department's activities. Therefore, the direction that is adopted in this research suggests that the strength of the relationship between IT outsourcing and strategy might be more evident at the departmental level than at the organizational level, which might further explain the non-significant findings obtained by Teng et al. (1995). In addition, given the abundant literature linking the constructs of strategy and structure, it is possible that the association between these constructs might better explain the variation in IT outsourcing at the IS department level.

3.2. Outsourcing of IS functions

Researchers have categorized IT activities into various groups or functions in the business world in order to capture and study their antecedents, effects, etc. (e.g. Tavakolian, 1989; Brown and Magill, 1994), and specific attention has been given to the outsourcing of these "functions and activities" (Fish and Seydel, 2006 p. 98). Appendix B presents various IT functions that have been studied in relation to outsourcing in previous literature. In general, the terms "IT functions" and "IT activities" have been jointly used

in the literature on IT outsourcing, without a clear definition of what each term entails. In few cases however (e.g., Grover et al., 1994b; Teng et al, 1995), "IT functions" were used to represent main functions under which specific IT activities fall. For example, "systems operations" represent one IT function (Grover et al., 1994b) under which various IT activities (e.g., hardware maintenance, network maintenance) (Aubert et al., 2004) fall. Due to the complexity and spread of IT throughout all business domains, and in order to study and better understand the phenomenon of IT outsourcing, researchers have been interested in examining "what" IT activities / functions to outsource (Dibbern et al., 2004). The following paragraphs present an overview of several studies that investigated the outsourcing of various IT activities / functions in the literature.

Grover et al (1994a) were interested in examining the extent to which various IT functions are being outsourced. They identified five major IT functions that are subject to outsourcing: 1) application development and maintenance, 2) systems operations, 3) telecommunications and networks management, 4) end-user support, and 5) systems planning and management. Outsourcing of these functions was measured, among 188 organizations, as the difference between the budgets allocated for the outsourcing of each function at the time of the study and three years earlier (Grover et al., 1994a). The authors determined the level of outsourcing of each function, as well as the cumulative level of outsourcing, which consists of the sum of the outsourcing of all functions (Grover et al., 1994a). Based on this analysis, systems operations was the most outsourced function followed by application development and maintenance (Grover et al., 1994a). Telecommunications management and end-user support had relatively similar levels of outsourcing, and systems planning and management was the least outsourced

among the five IS functions examined. Grover et al.'s (1994a) approach to examining outsourcing was also used by Teng et al. (1995) who looked at the same five IT functions, and assessed the relationship between the degree of IT outsourcing (aggregated and for each IT function) and the strategic orientation of the firm, as indicated in the previous section.

Ang and Straub (1998) considered three main perspectives for IT outsourcing among 243 banks in the U.S.: "operations perspective", "functional perspective", and "application perspective". Specifically, eight "major IS management activities" were identified under the functional perspective, and their level of outsourcing was determined, which represented a part of the overall IT outsourcing score (Ang and Straub, 1998). These management activities were: "IS strategy", "IT planning", "capacity management", "production scheduling", "IS human resources management", "security management", "network management", and "PC management" (Ang and Straub, 1998).

The interest in closely examining the phenomenon of IT outsourcing of various IT functions and activities persisted in more recent studies (e.g., Beaumont and Costa, 2002; Fish and Seydel, 2006). Beaumont and Costa (2002) identified nine "IT functions" in Australia that are being outsourced to various degrees in Australian organizations: "asset management", "help desk services", "data center operations", "analysis and strategy", "desktop services", "network services", "application development, implementation and maintenance", "hardware maintenance", and "others". The authors found that hardware maintenance and application development, implementation, and maintenance are the functions that were outsourced the most. Asset management and help desk services were the two functions that were outsourced the least.

Last and more recently, Fish and Seydel (2006) employed a survey of 181 IT professionals in the U.S. to investigate and rank currently outsourced "IT functions / activities", and identify the ones that are perceived to be gaining popularity in relation to outsourcing in the next three years. The nine IT functions / activities that were reported in this study are: 1) applications development, 2) applications maintenance, 3) data center operations, 4) PC acquisition, 5) PC maintenance, 6) systems development, 7) systems maintenance, 8) telecommunications / LAN, and 9) IT project management (Fish and Seydel, 2006). Application development ranked first among the IT functions that were currently outsourced, and was expected to maintain this position over the next three years (Fish and Seydel, 2006). Applications maintenance, systems maintenance and PC maintenance were also among the top "IT functions / activities" to be most commonly outsourced (Fish and Seydel, 2006). Table II.2 presents a summary of existing studies in the literature that considered various IT functions in relation to outsourcing.

Table II.2 A summary of existing studies in the literature that considered various IT functions in relation to outsourcing.

Major IT functions considered in relation to outsourcing	References
Telecom network management	Loh and Venkatraman, 1992; Lacity and Hirschheim, 1993; Grover et al., 1994; Teng et al., 1995, Grover et al., 1996; Ang and Straub, 1998; Beaumont and Costa, 2002; Fish and Seydel, 2006
Application development	Loh and Venkatraman, 1992; Lacity and Hirschheim 1993; Grover et al., 1994; Teng et al., 1995, Grover et al., 1996; Beaumont and Costa, 2002; Fish and Seydel, 2006
Systems planning and development	Loh and Venkatraman, 1992; Grover et al., 1994; Teng et al., 1995, Grover et al., 1996; Ang and Straub, 1998; Beaumont and Costa, 2002; Fish and Seydel, 2006
Systems operations and maintenance	Grover et al., 1994; Teng et al., 1995, Grover et al., 1996; Fish and Seydel, 2006

One of the objectives of this study is to examine the management practices of various IS department configurations through investigating the level of outsourcing of major IT activities in these departments. For this purpose, a list of the major IT activities of IS departments was developed, as will be explained under the qualitative phase, which will be used to assess the level of IT outsourcing.

4. IS department performance

4.1. Organizational versus departmental performance

It is essential for organizations to identify and understand various organizational aspects that affect performance, and closely monitor their performance. In order to be able to assess the effect of any specific factor on an outcome, such as performance, it is necessary to first have a clear conceptualization and operationalization of the outcome construct (DeLone and McLean, 1992).

Several authors have been interested in studying indicators of organizational performance. Some used financial indicators such as return on assets, return on investment, return on equity (e.g. Adjaoud et al., 2007; Goll et al., 2008). Others used market-related measures as indicators of the performance of the firm such as market share and market value added (e.g. Adjaoud et al., 2007; Jang and Lin, 2008). Cost and profit measures have been also been considered as indicators of organizational performance (e.g. Oh and Pinsonneault, 2007; Jang and Lin, 2008). Nevertheless, the complex nature of business organizations, and multitude of variables that may play a role and affect performance, makes it difficult to specifically identify the direct determinants of good performance.

As highlighted by Broderick and Boudreau (1991) in relation to open systems models, organizations are made of small islands, the "departments", whereby each might have its own characteristics, strategy, structure, performance, etc. Jointly, these units coordinate their efforts to achieve organizational goals, and hence project the overall organizational performance. As such, the performance of the whole organization is based on the performance of its departments.

In the business field, there has always been a "conventional wisdom" that the IS discipline has many "reference disciplines", yet without being itself a reference to any other discipline (Baskerville and Myers, 2002). One way to overcome this drawback and present valuable enhancements and contributions to the business world, lies in providing clear evaluations and sound recommendations for performance measures of the IS department, which would ultimately contribute to the overall organizational performance. In this research, specific attention is given to the performance of the IS departments in organizations, which have increasingly contributed to the organizational performance as a whole.

4.2. Perspectives on IS performance

In the IS field, researchers have suggested and adopted various approaches to measuring performance in relation to IS. Most of these studies focused on different units of analysis, other than IS department, and examined aspects related to IS success, application quality, systems delivery, IS group performance, and project performance (Delone and McLean, 1992; Rivard et al., 1997; Ravichandran, 1999; Nelson and Cooprider, 1996; Barki et al., 2001; Wallace et al., 2004). Nevertheless, limited attention was given to developing measures that reflect the performance of IS departments per se.

The following sections present an overview of studies in the literature that examined various outcome measures related to IS.

Delone and McLean (1992) illustrated one of the major issues that the MIS discipline was and is still facing: the identification of a unified and agreed upon dependent variable for "IS success". In order to prosper as a discipline, and provide valuable findings and recommendations, it is important to have a specific IS success measure that can be used as a reference for evaluating the success of various IS activities and investments (Delone and McLean, 1992). For this purpose, Delone and McLean (1992) conducted a literature review in the MIS discipline and found that researchers have used various constructs as reflective of IS success, which led them to propose the "IS success model". This model presents six categories of IS success interrelated constructs: system quality, information quality, use, user satisfaction, individual impact, user impact (DeLone and McLean, 1992). A comprehensive measure of IS success should encompass all of the above constructs (DeLone and McLean, 1992). Ten years later, the authors revisited their original model and proposed some modifications based on the feedback and reaction that they received. The resulting new model consists of three main interrelated parts (creation, use, and consequences of a system), which cumulatively form the IS success construct (DeLone and McLean, 2002).

Rivard et al. (1997) developed and validated an instrument to assess "user-developed application quality"; user-developed applications (UDA) represent applications that are developed by end-users for their own use or for the use of their colleagues (Rivard et al., 1997). Specifically, the authors created items to measure eight dimensions that reflect the quality of UDA: 1) reliability, 2) effectiveness, 3) portability,

4) economy, 5) user-friendliness, 6) understandability, 7) verifiability, and 8) maintainability (Rivard et al., 1997).

Furthermore, Ravichandran (1999) studied "software reuse" as a strategic approach in improving systems delivery performance, and investigated the effect of technological and administrative dimensions of software reusability on systems delivery (Ravichandran, 1999). The authors found that technological innovations on one hand, and administrative innovations on the other hand, intervene in the performance of the others. As such in order for software reusability to advance and bring along cost cutting advantages to the organization, units should change their evaluation and management practices in a way to encourage usability (Ravichandran, 1999).

Several authors focused on other units of analysis (e.g., IS groups, projects) when assessing IS performance (e.g., Nelson and Cooprider, 1996; Barki et al., 2001; Wallace et al., 2004). Nelson and Cooprider (1996) empirically investigated the effect of shared knowledge between IS groups and line customers on IS group performance. They used "the group" as a unit of analysis, and found that levels of shared knowledge between the two groups are positively related to "IS group performance" (Nelson and Cooprider, 1996). In order to measure the IS group performance, the authors conceptualized this construct based on two dimensions: the operational performance dimension and the service performance dimension of the group.

Barki et al. (2001) focused on the project as a unit of analysis, and considered the project performance as an outcome measure. Specifically, they assessed the impact of fit between software development project risk and its management on the outcome of the project, and conceptualized performance of the software development project in terms of

"efficiency and effectiveness through which the project was completed" (Barki et al., 2001). Efficiency of the development process was measured in terms of the "cost gap" (difference between the actual and the estimated cost of a project), while the effectiveness of the product was demonstrated through its quality and measured using the scale developed by Rivard et al. (1997) as presented earlier.

Similarly, Wallace et al. (2004) measured the project performance through measures that reflect efficiency and effectiveness. The project (system development) was the unit of analysis and its performance was assessed through two main dimensions: 1) product performance which refers to how successful the developed system is; and 2) process performance which reflects how successful the process of developing the system is (Wallace et al, 2004).

4.3. IS department performance measures

Very few researchers have examined the performance of the IS department as a whole (e.g. Pitt et al., 1995; Udo, 1998), rather than focused on other smaller units of analysis. Pitt et al. (1995) focused on the IS department as a unit of analysis and argued that the major function of IS departments is providing service, and as such, measuring the quality of the service provided (i.e. IS service quality) is a key aspect in evaluating the performance of the department as a whole. According to them, "They [IS departments] have expanded their roles from product developers and operations managers to become service providers" (Pitt et al, 1995). Hence, the authors adopted a marketing concept that measures quality of the service through the difference between the users' expectation and the perceived users' evaluation of the quality (Pitt et al., 1995). In application to the IS field, Pitt et al. (1995) calculated the difference between users' "service quality

expectation" and "service quality perceptions" to report the value of IS effectiveness at the IS department level within organizations (Pitt et al., 1995).

Another study that focused on the IS department as a unit of analysis was conducted by Udo (1998) who studied the effects of IS downsizing on the effectiveness of the IS department. Based on the literature, the author identified twelve main characteristics on which the IS department effectiveness is based: 1) "rate of response to demand"; 2) "how helpful is it in problem solving"; 3) "how available is it in supporting business units"; 4) "how timely are its services"; 5) "technical competency"; 6) "cost efficiency"; 7) "its role in helping meet organizational goals"; 8) "friendliness of its staff"; 9) "how resourceful it is"; 10) "how relevant it is to the business units"; 11) whether it is playing leadership role in information technology"; and 12) "its knowledge of functional areas". The author was able through a survey of 450 CIOs from large firms in the U.S. (response rate 22.6) to provide a list of key benefits and drawbacks of IS downsizing on the effectiveness of the IS department.

Recently, Rondeau et al. (2010) investigated the effect of IS strategic planning process on information systems and firm performance in manufacturing firms and found that IS strategic planning have a positive impact on firm performance through IS performance. The authors defined IS performance as "the senior managements' perception of the IS function's ability to facilitate better decision-making and aid in the better management of manufacturing activities" (p. 46). As such, IS performance was assessed through senior managers' perception. Upon closely examining the proposed IS performance measures, it was clear that three of the five items measuring this construct revolve around end-user satisfaction ("our IS function has failed to meet end-user

performance expectation", "end-users are generally satisfied with the services of the IS function", "end-users recognize the benefits of our IS function services") and the remaining two items focus on the perceived IS benefits ("the use of IS services has led to better management of manufacturing activities", and "our IS function is perceived as facilitating better decision making"). Although the authors did not focus on the IS department solely in this study and the response rate for their project was relatively low (4.3%), this paper emphasizes the importance of investigating the IS departments' environment and performance.

In summary, although researchers in the IS field have struggled to reach a unified measure of IS department performance, they emphasized on the importance of this outcome measure and managed to highlight critical aspects that should be considered when evaluating the performance of the IS department. Studies involving the IS department as a unit of analysis remain rare, and might not adequately reflect the situation in the IS departments at the present time. This is evident in the fact that only two previous studies investigated the performance of the IS department, whereas the majority of researchers have counted on organizational performance when evaluating the performance of IS departmental investments. As such, there is a need to develop a comprehensive measure that can capture the construct of performance, specific to the IS department, which is highlighted in the literature (e.g., Wade and Hulland, 2004).

5. Definition of terms

In order to be consistent throughout this research, the following definitions will be adopted for the terms and constructs that will be used in this study. Although variation in

the description and definition of these constructs exists in the literature, the definitions presented below will be used for the purpose of this research.

- Business strategy: “The determination of the basic long-term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals” (Chandler, 1962 p.16).
- Organizational structure: “Design of organization through which the enterprise is administered” (Chandler, 1962 p.16).
- IS department strategy: The determination of the basic long-term goals and objectives of the IS department and the adoption of courses of action and the allocation of resources necessary for carrying out these goals (based on Chandler’s (1962) definition of “business strategy”)..
- IS department structure: “Design of organization through which the IS department is administered” (based on Chandler’s (1962) definition of “organizational structure”).
- IT outsourcing: The handover of an IT-related activity to an external supplier (based on Aubert et al.’s (2004) definition of outsourcing p. 922).
- Configuration: “Any multidimensional constellation of conceptually distinct characteristics that commonly occur together” (Meyer et al., 1993 p. 1175).
- IS department performance: The quality of the services delivered by the IS department and how well the involved process is (based on Barki et al., 2001).

CHAPTER III: THEORETICAL FRAMEWORK

In this chapter, a presentation of the theoretical framework underlying this research will be provided. The first section will present the important and dominant approaches that have been previously adopted in the literature for theory building in the IS field. The second section will zoom in and focus on one of these approaches, the "configurational approach", which is used in this research. Last, in the third section, an illustration of the model and proposition underlying this research will be presented.

1. Theory building

Several researchers have explored and previously discussed the origin of conflicting results that is sometimes observed in the IS field. Among these researchers, Markus and Robey (1988) and Pollalis (2003) argued that the approach for theory development that has been adopted in the IS literature, and which often overlooked important factors in the process, might have contributed to inconsistencies in the reported results of various studies.

Markus and Robey (1988) focused on the "structure" of the theory, which embeds the nature and direction of the causal relationships, in their analysis of existing theoretical models, and provided recommendations for future solid theory building. The authors identified three dimensions of causal structure (causal agency, logical structure, and unit of analysis), and emphasized on the importance of carefully considering these three dimensions in the theory development process.

The first dimension, the causal agency, refers to the "identity" of the causal agent and the direction of the causal relationship (Markus and Robey, 1988). This dimension is

made up of three main conceptions: 1) the technological imperative, which views technology as the cause for various individual and organizational behaviors; 2) the organizational imperative, which argues that humans design information systems in a way that best serves the organizational needs; and 3) the emergent perspective, which believes that the consequences of information technology "emerge" from a wide range of social and technological interactions (Markus and Robey, 1988).

The second dimension of causal structure, the logical structure, refers to the underlying logic of the argument of the theory considered (Markus and Robey, 1988). Under this dimension, Markus and Robey (1988) argue that theories can be classified as either variance or process theories, which differ in the assumed underlying power of the "cause" to present an outcome. In other words, variance theories believe that the "cause" is "necessary and sufficient" to observe certain outcomes. Process theory however argues that "cause" is necessary but insufficient to show the outcomes.

The third dimension of causal structure, the unit of analysis, refers to the entities under investigation that are divided into two main categories: micro-level units that represent individuals and groups; and macro-level units that represent organizations industries, communities, etc. (Markus and Robey, 1988).

Based on their examination of existing theories in relation to the causal structure, Markus and Robey (1988) argued that the conflicting and inconsistent results that have been reported by researchers in the IS field are in part due to the lack of proper consideration of the above three dimensions in theory building. In addition, the authors highlighted that IS researchers have often used different perspectives to test causality,

focused heavily on static rather than dynamic relationships, and finally mixed levels of analysis, which led to vague and misleading results.

More recently, Pollalis (2003) further highlighted that the conflicting results about the role of IT in organizations, as reported in prior research, is mainly due to the approaches that were adopted by researchers. Dominant research in the IS field tend to adopt a deterministic-contingency approach and encourage analysis of results rather than their synthesis (Pollalis, 2003). Researchers focus on causal relationships among few important variables while ignoring the totality and interaction of the variables that would give better insights about the organizational reality, which leads to a huge gap between "organizational reality" and "research reality" (Pollalis, 2003). The author further argued that, by adopting the fit and best match notions, IS research have applied an "inquiry-from-the-outside" approach to try to understand "what organizations do without considering how they do it" (Pollalis, 2003).

Prior research adopting the fit approach focused on measuring the degree of fit between constructs and their effects on organizational performance. Most of the previous studies within this stream of research argue that more fit between the constructs would lead to better performance (Pollalis, 2003). Nevertheless, findings did not always coincide with this general proposition; instead, as highlighted by Pollalis (2003 p.472), "low correlations and conflicting results regarding those fits and their impact on performance have generated criticisms and lessened the value of the contingency approach (Weill and Olson, 1989a; b; Peters, Heng, and Vet, 2002)". This led researchers to either recommend future investigation of the inconsistencies between their underlying propositions and findings (e.g., Chan et al., 2006), or narrow the applicability of their

proposed theory (e.g. Bergeron et al., 2004). For example, Chan et al. (2006) found that alignment had positive effects on performance among organizations classified as prospectors and analyzers, but not defenders, and they suggested that future research further investigates this inconsistency. Furthermore, Bergeron et al. (2004) found that organizations, which had no conflict in their overall alignment and were expected to have high levels of performance, did not actually perform well. They concluded that fit between business dimensions and IT dimensions can only explain performance of organizations that have attained a minimum level of alignment in various domains.

As can be seen from the above examples, although intuitively the causal relationship between fit and performance seems logical, previous research that has focused on these constructs have shown that this causal relationship does not always apply. Hence, researchers should consider alternative approaches in building theories that better reflect the nature of this relationship; one approach that has been argued to be suitable in this context is the "configurational approach" (Ketchen et al., 1993; Meyer et al.,1993; Miller, 1986; 1996; Pollalis, 2003), which will be adopted in this research.

2. The configurational approach

2.1. Definition of the configurational approach

The configurational approach refers to a school of thought that can be summarized by "all of the above", whereby the attributes of the whole are not limited to those of its parts (Mintzberg, 1990). A configurational perspective emphasizes the holistic consideration in understanding entities and argues that units cannot be understood in separation; instead, these units acquire their meaning from the whole (Meyer et al.,

1993; Short et al., 2008). Miller (1996, p.509) defined a configuration as "the degree to which an organization's elements are orchestrated and connected by a single theme", which is similar to Venkatraman's (1989) view of "fit as gestalt" that reflects the "internal coherence among a set of theoretical attributes". The gestalt approach proposed by Venkatraman (1989) entails investigating a criteria-free coherence among many variables without being concerned in specifying the form of the existing relationship. As such, this approach aims at investigating emerging trends of relationships between common attributes. Researchers have used the terms "gestalts" and "configurations" interchangeably to refer to groups of characteristics, attributes, or variables that commonly co-exist (e.g. Dess et al., 1993; Bergeron et al., 2004; Raymond and Croteau, 2006). For example, Dess et al. (1993 p.776) considered the term configuration "to be synonymous with both gestalt and archetype", and they distinguished between configurations and gestalts on one hand, and taxonomies and typologies on the other hand, based on the number of organizational domains involved in each. They argued that taxonomies and typologies are formed from elements of a single organizational domain (e.g. strategy, structure, environment), whereas configurations and gestalts represent relationships of elements belonging to different organizational domains.

2.2. Characteristics of the configurational approach

The configurational approach it provides a richer meaning of observations since it aims at understanding phenomena in their real contexts (Meyer et al., 1993). Furthermore, the fact that the configurational theory is based on nonlinearity between parts further highlights the freedom that this theory gives to the involved constructs to behave with no restrictions, which better reflects real life scenarios and settings (Meyer et

al., 1993). Finally, the configurational approach recognizes equifinality, which portrays that various forms can be equally effective (Meyer et al., 1993).

In a study examining the impact of three types of integration (technological integration, functional integration, and strategic integration) on the planning process and organizational performance, Pollalis (2003) adopted the configurational approach and summarized its characteristics into five main attributes. First, it entails simultaneous studying of organizational characteristics in order to provide a holistic and rich description of reality (Pollalis, 2003). Second, it is directed towards identifying "common clusters" of attributes (Pollalis, 2003). Third, it represents "holistic processes" rather than deterministic causal relationships (Pollalis, 2003). Fourth, it involves longitudinal studies to demonstrate changes in configurations over time although cross-sectional field studies are also crucial to identify current organizational states (Pollalis, 2003). Last, it combines the collection of both quantitative and qualitative data in order to provide rich and systematic insights about real-life settings (Pollalis, 2003).

The configurational theory is specifically suitable in the strategic management discipline due to the vast number of interrelated dimensions involved in strategic management (Meyer at al., 1993; Ketchen et al., 1993). It strongly suggests the use of archetypes, typologies, and attributes that simplify and better represent and explain reality (Ketchen et al., 1993). Meyer et al. (1993) highlighted the core difference between contingency theorists and configuration theorists by stating that "Rather than [in reference to contingency theorists] trying to explain how order is designed into the parts of an organization, configuration theorists try to explain how order emerges from the interaction of those parts as a whole" (Meyer et al., 1993 p. 1178). Finally, Becker and

Gerhart (1996 p. 782) portrayed the difference between the universalistic, the contingency, and the configurational approaches by presenting the underlying logic of each, respectively, through the question "Is there one best way, many best ways, or does it depend?"

2.3. Inductive versus deductive approaches to configurations

Two main approaches have been identified in the literature in relation to studying configurations: the deductive and the inductive approaches (Ketchen et al., 1993). On one hand, the deductive approach is a "priori" and relies on the use of theories to define configurations and predict their performance (Ketchen et al., 1993). On the other hand, the inductive approach is a "posteriori"; configurations as well as their performance emerge from empirical testing and observations (Ketchen et al., 1993). Ketchen et al. (1993 p. 1287) stated that "Both the inductive and the deductive approaches have a straightforward goal of describing what configurations are present in an industry". Nevertheless, there are differences in the underlying assumptions of these two approaches. Given the exploratory nature of this study that aims at exploring the profiles of IS departments in their natural settings, and uncovering emergent IS department configurations based on their strategy and structure attributes, the inductive approach will be adopted. The identification of various existing IS department configurations, and the assessment of their relationship with their respective departmental management practices (i.e. level of IT outsourcing) and performance will be based on empirical testing. The next section presents an overview of studies that adopted the configurational approach to study various phenomena in the business field.

2.4. Applications of the configurational approach

In an application of the configurational theory, Miller (1986) used the deductive approach to propose and define four strategy-structure configurations at the organizational level: simple niche marketers, mechanistic cost leaders, innovating adhocracies, and divisionalized conglomerates (Miller, 1986).

First, simple niche marketer is one type of strategy-structure configuration that joins simple organizational structure with a differentiation strategy (Miller, 1986). Organizations with this type of configuration emphasize on decreasing structural complexity to provide distinctive and differentiated products for customers (Miller, 1986).

Second, mechanistic cost leader is a second type of strategy-structure configuration, which is a product of the mixture between machine bureaucracy structure and a cost leadership strategy (Miller, 1986). Firms belonging to this configuration type focus on work standardization and enhancement of technical skills in order to boost efficiency, and hence decrease costs (Miller, 1986).

Third, innovating adhocracy is a configuration made up of adhocracy structure combined with innovative differentiation strategies (Miller, 1986). The nucleus of this form of configuration is composed of a dynamic and unstable environment along with an extremely innovative drive that aim at providing new and distinctive products to customers (Miller, 1986).

Fourth, divisionalized conglomerates configuration portrays the merge of divisionalized organizational structure whereby the organization is divided into separate divisions, each in control of its own operations, and a diversification strategy (Miller,

1986). This combination of strategy and structure ensures that each domain (diversified) is best controlled by its respective specialists (Miller, 1986).

The typologies proposed by Miller (1986) were mainly based on the literature. The author specified that these combinations are based on the "best match" between various business strategy and business structure types. In 1996, ten years later, Miller revisited his original work and explained that he intended to use the four configurations for illustrative purposes only, and that many more strategy-structure configurations may exist that need to be investigated.

In the IS field, Lee et al. (2004) also adopted the deductive perspective to configurations to compare the configurational approach to two other approaches, the universalistic and contingency approaches, in investigating the effects of IT outsourcing strategies on its success. They highlighted the importance of the configurational perspective and found that it was the best approach for explaining outsourcing success, in light of the interdependencies between the independent variables considered.

Ferratt et al. (2005) also used the deductive configurational approach to link various IT human resource management (HRM) configurations to the rates of IT staff turnover. The authors defined the configuration of HRM practices as "the set of practices to manage workers"; as such, IT HRM configurations exhibit the set of practices adopted to manage IT workers. In order to test their hypotheses, the authors conducted a survey of 106 organizations and identified five major IT HRM configurations: human capital focused (HCF), secure, incented technician, utilitarian, and task-focused (TF) (Ferratt et al., 2005). The findings indicated that "human capital focused configurations" enjoyed lower IT staff turnovers than any other configuration (Ferratt et al., 2005).

More recently, Raymond and Croteau (2006) applied the inductive perspective to the configurational approach to examine co-alignment between four main strategic development attributes (network development, product development, market development, and advanced manufacturing systems (AMS)). The authors used the "SPSS TwoStep clustering algorithm" and identified three main clusters of organizations, whereby each differed from the other two on the basis of the relationships among the above attributes. The three identified clusters were named: local SMEs, transition SMEs, and world-class SMEs (Raymond and Croteau, 2006). These three configurations varied by performance; while world-class SMEs achieved higher levels of performance than the local ones, transition SME's showed no significant difference in outcome from the other two configurations.

In summary, the importance of the configurational theory has been highlighted in the literature in relation to strategy, structure, and IT. Nevertheless, research in the IS field, which have mostly adopted the deductive approach to configurations, has not fully benefited from the value of this theory to explain various aspects related to the management and performance of IS departments. Given the association of strategy and structure attributes, this study follows Miller's recommendations for studying the links that join these two constructs at the IS department level. Specifically, it adopts the configurational approach to inductively explore and map the strategy and structure attributes of IS departments, identify the emerging IS department configurations based on the clustering of these attributes, assess the management practices of IS departments in relation to the emergent configurations by examining their level of outsourcing of major IT activities, and evaluate the performance of the emergent IS department configurations.

3. Model and propositions

The research model in this study focuses on the IS department which has not been adequately examined in previous research in relation to its profile, management practices, and performance. Each IS department is characterized by specific strategy and structure attributes. When mapped together, these attributes form configurations that reflect the profile of the respective IS departments.

The constructs of strategy and structure have been previously studied in the literature using the "configurational" or "gestalt" approach (e.g., Miller, 1986, 1996; Bergeron et al., 2001; Bergeron et al., 2004). Specifically, Venkatraman (1989) presented the "fit as gestalt" approach as one type of fit between constructs, which was extensively adopted in subsequent research in the IS field (e.g., Bergeron, 2001; Lee et al., 2004; Raymond and Croteau, 2006). Nevertheless, the analyses presented in these studies involved a deterministic-contingency approach in most instances, and did not focus on the IS department as a unit of analysis. As discussed in the theory building section, these approaches were often limited by their underlying assumptions (e.g., causal relationship, higher fit leads to higher performance) and presented conflicting and inconsistent results. This led researchers to recognize the importance of examining these relationships using more "holistic" and "realistic" approaches (Meyer, 1993). The current research addresses this issue and adopts the configurational approach to study emergent configurations in the context of IS departments, thus reflecting the reality and environment in these settings. As such, the first proposition in this research focuses on the identification of emerging IS department configurations based on the strategy and structure attributes of these departments.

Proposition 1: IS departments' strategy and structure attributes cluster together to form distinct IS department configurations.

Linking emergent IS department configurations to important aspects of the business world, such as management practices and IS department performance, will add to the theoretical as well as the practical contribution of this study.

The constructs of strategy and structure have been extensively linked to performance in previous literature (e.g. Hall and Sias, 1980; Henderson and Venkatraman, 1993; Sabherwal et al., 2001; Bergeron et al., 2004; Yin and Zajac, 2004)[5]. Nevertheless, previous investigation of the relationship between IS strategy and IS structure on one hand and performance on the other hand, has been always done from a contingency perspective whereby researchers examined the effect of various forms of these constructs on organizational or firm's performance. This research differs from prior work done in this area by exploring the relationship between the IS department's strategy, structure and performance from an inductive configurational perspective, without focusing on any causal relationship. Furthermore, by considering the IS department as a unit of analysis, this research examines the performance of the IS department per se, an area that has not been adequately addressed in the literature. Given the importance of "performance" as an outcome measure, it is essential to have a clear understanding of the immediate association between departmental constructs and department performance, which would provide a better understanding of the internal processes in real settings. As such, the second proposition in this research examines the relationship between IS department configurations and IS department performance.

[5] A detailed description of these studies is provided in the Literature Review chapter.

Proposition 2: IS departments with various IS department configurations will be associated with different IS department performance levels

The interest in examining the relationship between various IS department configurations and level of IT outsourcing stems from the importance of IT outsourcing as a way to manage IT activities, as well as the findings in the literature that emphasize on the relationship between these three constructs. For example, Das et al. (1991) argued that firms adopting a prospector strategy focus on acquiring their resources from an external supplier, while those following a defender strategy are more likely to develop their IT internally. Along this line, Gilley and Rasheed (2000) reported a positive and significant relationship between innovation and IT outsourcing intensity. Furthermore, Weill and Ross (2004, 2005) argued that investments in IT, including those in IT outsourcing, represent one of five decisions falling under IT governance that organizations have to make. Finally, Oh (2005) also found that IT outsourcing acts as an "aggressive organizational intervention" mechanism to reduce organizational risk, and that IT governance mode has a moderating effect on the relationship between the role of IT outsourcing in decreasing uncertainty and the decision to outsource.

Although prior research highlight the link between strategy, structure, and IT outsourcing, all previous studies that investigated this relationship did so by focusing on IT outsourcing and one of the other two constructs (strategy or structure). By examining the relationship between these three constructs together, this research takes a step further in providing a deeper and richer understanding of the environment in IS departments. This introduces the third proposition in this research that focuses on the relationship between IS department configurations and their level of IT outsourcing:

Proposition 3: IS departments with various IS department configurations will engage in different levels of outsourcing of their IT activities.

As indicated in Figure III.2, the research model illustrates an example of an IS department configuration that would emerge from the mapping of the strategy and structure attributes in an IS department. It also presents the relationship between this specific configuration and the performance, as well as the management practices of IT activities (i.e. level of IT outsourcing), of the respective IS department. It is important to highlight that the model focuses on the IS department as a unit of analysis, which is a major contribution of this research to the literature. It emphasizes on the absence of any causal relationship, and represents a holistic approach for capturing and examining the constructs in their natural settings with no restrictions in accordance with the general framework of the configurational theory.

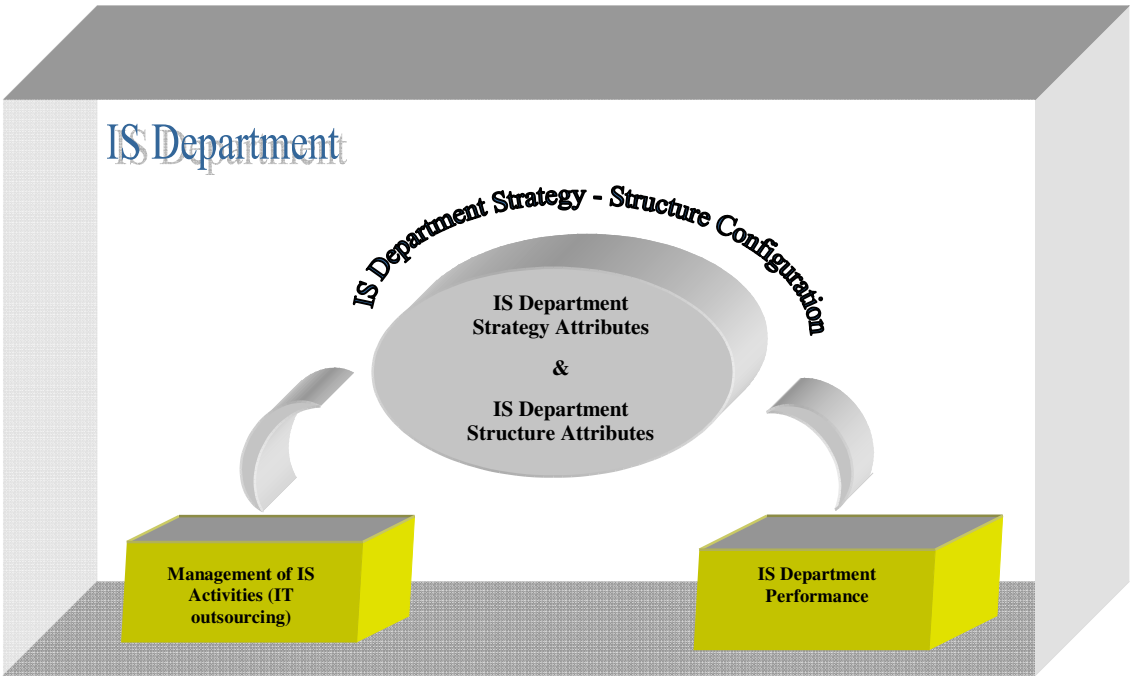


Figure III.1 Research model

CHAPTER IV: QUALITATIVE PHASE

1. Methodology

1.1. Case study approach

Although prior research has been conducted in the area of IS strategy and IS structure, these studies did not investigate these two constructs at the IS department level, and hence IS department strategy and IS department structure remain two vague constructs that need to be further explored. In addition, studies investigating the IS department performance are very scarce and the most recent one dates back to 1998 (i.e. Udo, 1998). As such there is a need for the exploration of this area, especially with the ongoing advancement of the IS field.

Following Benbasat et al.'s (1987) criteria under which a case research is appropriate, four case studies were conducted in the qualitative exploratory phase of this research. Specifically, primary data were collected from business organizations in Canada through four case studies in order to explore the constructs under investigation (i.e. IS department strategy, IS department structure, IT outsourcing, and IS department performance), and identify contemporary attributes that reflect these constructs in their natural setting.

Benbasat et al. (1987) argue that case study design is suitable for exploratory research, where there is no predetermined independent and dependent variables, and when the complexity of the phenomena of interest is high necessitating studying it in its "natural settings". This is applicable to the current research that examines the complex relationship between strategy, structure and performance in the natural settings of IS departments.

Yin (2003 p. 20) defined a research design as the "logical plan for getting from *here* to *there*, where *here* may be defined as the initial set of questions to be answered and *there* is some set of conclusions (answers) about these questions". One major concern for the case study approach is the absence of a clear and "comprehensive catalogue" available for conducting this type of research (Yin, 2003 p. 21). Nevertheless, five main components exist that are essential in the design of case studies: 1) "a study's questions"; 2) "its propositions, if any"; 3) "its unit(s) of analysis"; 4) "the logic linking the data to the propositions"; and 5) "the criteria for interpreting the data" (Yin, 2003 p.21). As such, the design should portray what data to collect, as addressed in the first three components, as well as what to do after data collection, which falls under the last two components (Yin, 2003).

Furthermore, Dubé and Paré (2003) identified, based on the recommendations of key pioneer case study researchers in the field (e.g. Benbasat et al., (1987); Eisenhardt (1989), Lee (1989)), a set of criteria for the evaluation of rigor of IS positivist case research. They grouped these criteria under three main categories: 1) "research design"; 2) "data collection"; and 3) "data analysis" and provided clear guidelines for conducting case studies while ensuring high rigor, which leads to the prosperity of the field. In order for this study to benefit from previous work done in the area of case study research and ensure high quality and rigor, Dubé and Paré's (2003) recommendations for conducting exploratory positivist case study research will be followed. The next sections present the three major categories and their corresponding attributes as identified by Dubé and Paré (2003) along with the way they are addressed in this research project.

1.2. Research design

Clear research questions: Dubé and Paré (2003) indicated that having clear and direct research questions represents one of the most important steps in case study research. They argued that the suitability of case studies as a research method is dependent on the type of research question addressed. As suggested by Yin (2003) and confirmed by Dubé and Paré (2003), case studies are most suitable for "how" and "why" questions. They emphasized that case studies addressing a "what" question are suitable for exploratory research, which investigates a new phenomenon that is not previously studied (Yin, 2003; Dubé and Paré, 2003); this is the case in this research project whereby no prior research has examined the relationship between IS department strategy, structure and performance. The research questions for the qualitative part of this research project (i.e. the case studies) are:

1. What are the attributes that reflect the IS department strategy and structure?
2. What are the criteria that IS departments use to evaluate their performance?
3. What are the IT activities that are being outsourced by IS departments?

A priori specification of constructs: Another key component in case study research is "a priori" specification of the constructs under study (Dubé and Paré, 2003). In the context of this research project, the investigated constructs are: IS department strategy, IS department structure, IS department performance, and IT outsourcing.

Multiple case studies: One of the major criticisms to case study research is their dependence on a single case (Dubé and Paré, 2003). Markus (1989) indicated that single case study may be suitable for research of exploratory nature that is intended to "disconfirm an existing theory", which is not the case with this project. As such, and in

order to "maximize what can be learned in the period of time available for the study" (Dubé and Paré, 2003 p. 609), a multiple case study design was adopted, whereby four IS departments from different industries were selected to participate in this research project.

Replication logic in multiple-case design: Yin (2003) highlighted that the logic behind selecting multiple case studies is that of replication and not sampling. As such, a case must be strategically selected to either "predict similar results" (literal replication) or "provide contrasting result" (theoretical replication). In this research four cases from different industries were conducted in compliance with the literal replication strategy, whereby the purpose is to increase the richness and ensure generalizability of the results. This approach has been used before by Broadbent et al. (1999) who selected four firms from two different industries to show that the phenomenon under study, in that case IT contribution to success of reengineering, is not industry specific (Dubé and Paré, 2003).

Unit of analysis: Clearly defining the unit of analysis in exploratory case studies is crucial for the identification of the theory's boundaries and applicability (Dubé and Paré, 2003). Hence, as indicated in previous sections, the unit of analysis for this study is the "IS department".

Pilot case: Conducting a pilot study in exploratory research is essential for adjusting the tools used in data collection, as well as allowing the researcher to be acquainted and comfortable with the process (Yin, 2003; Dubé and Paré, 2003). It can detect any flaws or ambiguity in the instrument and demonstrate its ability in capturing the needed data. The choice of the pilot case may vary depending on a range of variables such as ease of accessibility, convenience, richness of resources, etc. (Yin, 2003).

In this research project, a pilot case study was conducted in a medium sized rural hospital in Canada, which serves about 50,000 individuals from Quebec and Ontario, employs 470 persons, and has annual revenue of 38 million dollars. An interview was conducted with the chief information officer (CIO) who also acts as the chief financial officer (CFO) and vice president (VP) of the hospital[6]. Furthermore, documents were collected regarding the departmental strategic plan as well as the internal structure and the rules governing the administration of the department. Based on the pilot case study, the researcher incorporated minor modifications to the original data collection instrument[7]. Furthermore, the pilot case familiarized the researcher with the interview process and portrayed a better idea of the actual time required for the interview so as to ensure that the allocated time for the interview is respected.

Context of the case study: In order to give more meaning to the case, ensure credibility, and allow for generalizability, it is important to describe the context of the case study (Benbasat et al., 1987; Yin, 2003). Dubé and Paré (2003) identified five aspects that are important to describe the research context of the study: 1) description of the site(s); 2) case period; 3) design; 4) time spent on the site by the researcher(s); and 5) nature of the data (retrospective, on-going, both). In this project, the researcher describes the site in which each case was conducted, and presents its time period and duration. Furthermore, it is important to note that since the project is cross-sectional in nature, retrospective and current data were collected.

Team-based research & different roles for multiple investigators: Collaboration between researchers is highly recommended in case studies in order to ensure reliability

[6] For a summary of the pilot case study, please refer to Appendix C
[7] The list of modifications incorporated appear in Appendix D

and confidence in the findings (Eisenhardt, 1989; Dubé and Paré, 2003). In this research project, the data collection and coding was conducted by one researcher, and the coding and analysis were further validated by two other researchers in order to increase objectivity and reliability of the results.

1.3. Data collection

Multiple data collection methods & mix of qualitative and quantitative data: Dubé and Paré (2003) argued that multiple data collection methods (e.g. interviews and documentation), and the use of a mix of qualitative and quantitative data is desirable to increase rigor in IS case studies. In this project, data were collected using "standardized open-ended interviews" with CIOs (or IT directors when applicable) and managers belonging to various departments within the respective organizations, as well as documents related to the objectives of the study. The interviews consisted of qualitative questions (e.g., how would you describe the strategy of your department?) and quantitative questions (e.g., what was the actual IS department budget for last year?). Specifically, the interviews conducted with the CIOs (or IT directors when applicable) investigated four core issues. First, each respondent was asked to identify the attributes that most accurately describe his / her respective IS department strategy and structure. Second, the interviewees were asked to provide information about the current major activities in which their respective IS departments are involved; this reflected what is currently done in these departments. Third, the respondents were asked to provide information about the way through which their departments are managing their activities (in terms of in-sourcing versus outsourcing). Fourth, the CIOs or IT directors identified the criteria used to monitor the performance of their IS departments. Finally, managers

belonging to various departments within a respective organization were asked to evaluate the performance of the IS department in that organization based on the criteria identified by the CIOs or IT directors as well as any other criteria that they felt were appropriate.

Patton (2002) identified four main reasons for adopting the "standardized open-ended interviews" including: availability of the instrument for evaluation; minimizing variability between interviews; efficient use of the interview time; and facilitating analysis by making responses more identifiable. In this type of interviewing, the researcher develops and writes all questions before the interview. The main strengths of this approach involves increasing comparability of responses, decreasing biases of the interviewer, providing clear and documented chain of evidence, and facilitating organization and analysis of data (Patton, 2002). In this project, the researcher asked the interviewee at the end of each interview to have access to any document (memo, mission statement, departmental chart, etc) that he / she think might be relevant to the study.

Data triangulation: Although having multiple sources of data is desirable and can support the findings and conclusions reported, it has not been very common in case study research in the IS field (Benbasat, 1987; Dubé and Paré, 2003). This might be due to the narrow sedimentation of knowledge in most studied cases. For example, in the case of this research project, the CIO or IT director is the individual who knows most about the strategic orientation of the IS department as a whole. Although other informants will have their own perspectives on the constructs involved in this project (e.g. strategy, structure, evaluation criteria), these views might not be comprehensive and relate to different levels of analyses than the IS department (e.g. group, project, etc). In order to increase rigor while ensuring that the data collected reflect the IS department as a unit of analysis, the

researcher asked the interviewee at the end of the interview process if there is anyone in the firm that he / she believes can give additional insights in relation to the questions raised in the interview; in such a case, that person was contacted and interviewed. Furthermore, in order to ensure data triangulation, the researcher made sure to contact multiple managers within the same organization to get their input on the constructs under study; this is specifically important in identifying the performance f the IS departments. As such, managers within the organization yet not belonging to the IS department were asked to identify the criteria through which they would evaluate the performance of the IS department. Furthermore, these managers were asked to rate the performance of the IS department at their organization based on a provided list of questions (the list was constantly updated after each case).

Case study protocol and database: The main purpose of the case study protocol is to ensure reliability of the study (Dubé and Paré, 2003). It is favored in any type of case studies, but it is exceptionally critical in multiple case studies (Yin, 2003) since it minimizes biases between cases. The protocol presents the procedures and rules that direct the use of the data collection instrument during the course of the case study (Yin, 2003). Yin (2003 p.69) suggests that a case study protocol should include an "overview of the project", "field procedures", "case study questions", and if applicable a "guide for the case study report". Appendix E presents the protocol that was used in this project.

It is important to note that, given the exploratory nature of the case studies, it was not possible to adopt a pre-existing set of questions that reflect the constructs under

study. Yet, the constructs investigated in this research had been examined before at other levels than the IS department per se.[8]

A case study database, which included all gathered data, interview transcripts, notes, documents, tapes, etc, was also built in order to increase the reliability of the findings as suggested by Dubé and Paré (2003).

1.4. Data analysis

Field notes, coding, data displays and flexible and opportunistic process: Field notes were taken throughout the interview process and included verbal and non-verbal information as recommended by Dubé and Paré (2003). In this research, the data collection and analysis[9] were performed in parallel since an overlap between the two is highly recommended in case study research (Eisenhardt 1989; Patton, 2002; Dubé and Paré, 2003; Yin, 2003). In addition to giving the researcher a head start in analysis, performing the data collection and analysis in parallel enabled the researcher to benefit from a major feature of case study research, the "flexibility of data collection", whereby adjustment in the data collection process can be performed if necessary (Dubé and Paré, 2003).

Logical Chain of Evidence: Maintaining a logical chain of evidence is important in order to ensure reliability of the study. As described by Yin (2003), the purpose of maintaining a chain of evidence is to provide the reader with the evidence that would support any claim made in the case study. Thus, the chain of evidence enables the reader to understand and walk through the logic and steps that link the research question to the conclusion, and ensures that no data is lost due to bias or neglect (Yin, 2003). In this

[8] Appendix F presents the justification for the questions used in the case studies.
[9] Please refer to the mode of analysis section for a detailed explanation of the data analysis technique that was adopted.

project, the chain of evidence consists of the coding scheme, transcripts, documents and materials used.

Quotes: Dubé and Paré (2003) recommend the use of quotes in case reports and argue that quotes enable an external observer to evaluate the merits of the analysis. As such and in order to follow this recommendation in this project, key phrases and quotes that portray the critical ideas or important comments by the interviewees were presented to the reader.

Mode of analysis: Data analysis is a very challenging part of qualitative case studies since it "transforms data into findings" in the absence of any formula for this transformation (Patton, 2002 p.432). Yin (2003) identified four main analytical techniques that are commonly used in case studies: 1) pattern matching, 2) explanation building, 3) time-series analysis, and 4) logic models. The logic of the pattern matching technique is to compare empirically derived pattern to a predicted one. The explanation building technique however, aims at analyzing the data through building a narrative explanation of the case. Finally, the time-series analysis and logic models focus on collecting data over long periods of time in order to identify a pattern of events over time.

Patton (2002) elaborately described the process of turning qualitative data into patterns and themes. The author described content analysis as involving "identifying, coding, categorizing, classifying, and labeling the primary patterns in the data" (Patton, 2002 p. 463). The first step in this analysis denotes "developing a manageable classification or coding scheme" and is done by reading the field notes and interviews, and writing comments in the margins about aspects that would divide the data into topics and files. As such, the purpose of the first reading of the data is to develop a coding

category or a classification system to organize "what has been collected during fieldwork" (Patton, 2002). The second reading aims at coding the collected data under the identified categories based on the developed coding scheme. Finally, the third step of the analysis involves determining the significance and meaning of the data. In this step, and in light of the absence of statistical tests that can indicate significance of the findings, analysts rely on their analytical thinking, intelligence, judgment, and the responses of people who review the findings to determine the relevance and significance the results (Patton, 2002).

In this project, the researcher read and transcribed the responses of the interviewees, and marked his comments regarding the categories and themes on the margins. This exercise gave rise to a precise coding scheme that was adopted for the actual coding of the data into categories that reflect the related constructs (IS department strategy, IS department structure, IS department performance, and IT outsourcing). Appendix G presents an outline of the coding scheme that was adopted in this project. Once all the data were coded, a summary of each case study was developed and presented to two other researchers for validation. Finally, once coding of the data was complete, the attributes that best reflect each of the constructs under study were determined. A summary of the characteristics of the three major business strategic typologies (defender, analyzer, and prospector) as well as the three main organizational internal structures (centralized, hybrid, decentralized) is presented in table IV.1. These characteristics were used as guidelines for the analysis of each case study.

Table IV.1 Summary of the characteristics of major business strategic typologies and main organizational structures

Strategic Typology	**Defender**	**Analyzer**	**Prospector**
	Follow a conservative competitive strategy	Follow a moderate competitive strategy	Follow an aggressive competitive strategy
	Focus on efficiency	Focus on efficiency and effectiveness	Focus on effectiveness
	Invest in a narrow market without considering external environments	Focus on internal and external markets	Invest in searching for and targeting external markets
	Focus on satisfying their current customers	Aim at serving their current customers and future potential ones	Aim at reaching a wide range of customers
	Improve their current operations	Divide investments over improvement of current operations and the search for new venues	Focus on innovation and product development
	Inward oriented	Inward and outward oriented	Outward oriented
Internal Structure	**Centralized**	**Hybrid**	**Decentralized**
	Major decisions are made by one or very few individuals	Some major decisions are made by top executives while others are made collectively	Major decisions are made collectively
	Decisions are made to the top level	Decision-making is spread between top levels and functional units	Decisions are made at any organizational level.
	High degrees of hierarchy	Medium degrees or hierarchy	Low degrees of hierarchy
	Many hierarchical levels	Some hierarchical levels	Few hierarchical levels
	High degree of formality in interaction	Medium degree of formality in interaction	Low degree of formality in interaction

2. Results

2.1. Case 1: GCMC

This case was conducted at a 30-year old publicly traded gold Canadian mining company (GCMC) that focuses on underground gold production. GCMC is traded on Toronto Stock Exchange, New York Stock Exchange, and the Frankfurt Stock Exchange; 85% of its shares are held by institutions and the rest are held by individuals. GCMC have several exploration activities in various geographic locations in Canada, the United States, Mexico, and Europe. It is one of the largest gold deposits in North America with around 2,000 employees and average annual revenue of 180 million U.S. dollars.

GCMC focuses on maintaining a strong financial position and direct a big portion of its investments towards increasing its cost efficiency. Few illustrations of this strategic orientation include: 1) implementation of a temperature control system on many major sites, which allowed continuous operations in all weather conditions; 2) use of a highly efficient water intake system that would help decrease energy consumption; and 3) improvement in the underground ventilation system in order to shut automatically after each shift. In addition, keeping a low risk profile is another major objective for GCMC. For this reason, it limits its gold production to regions where there is minimal political risk and conflicts.

GCMC is designed with a vertical structure, with the board of directors on top of the organization. The board gets its advice and support from four main committees: 1) corporate governance committee; 2) audit committee; 3) compensation committee; and 4) health, safety, and environment committee. The vice chairman of the board also holds the position of chief executive officer; the president of GCMC acts as the chief operating

officer. Each geographic location has a vice president who overlooks the operations in the respective region.

The information systems (IS) department in GCMC employs around 22 employees, with an estimated budget of 7 million U.S. dollars for last year and an actual budget of 8 million U.S. dollars for the same year. The department manages the majority of its IT activities itself with only around 12% of its total budget going to outsourcing.

IS department strategy

The major four goals of the IS department at GCMC are to: 1) ensure data and employee safety; 2) provide reliable services; 3) operate in a cost effective manner; and 4) secure its equipment. The following paragraphs reflect the strategy of the IS department by describing the course of action that it adopts in order to achieve these goals.

First, data and employees' safety represents a major goal for the IS department. The department ensures that the data is safe from outsiders and that the entire network is constantly secure through having a strict policy of only using proven data protection security measures. Furthermore, it performs constant as well as occasional backup runs, and regularly monitors the logs to verify that they are filled with complete, adequate, and up-to-date data.

In order to ensure employee safety, the IS department makes sure that site employees and miners always have redundant tools (e.g., networks, equipments, phones) to use in case of any accident. In addition, the department is currently working on setting a formal disaster recovery plan that guides the employees in case of unexpected situations

and emergencies. This recovery plan addresses issues such as: “when to declare a disaster?”; “what to do in case of a disaster”; “who to call first in case of a disaster?” etc.

Second, in order to provide reliable communication systems and services, the IS department focuses on: 1) acquiring people with superior skills to the IS department who can provide technology expertise to employees of other departments; 2) constantly investing its resources in improving its existing operations; and 3) adopting reliable tested and recommended technologies.

Third, the IS department makes sure that the solutions they provide are cost effective through comparing vendors and services, and getting at least two quotes before purchasing. However, the IT director specified that although efficiency is very important, effectiveness is more critical for the department since IT cannot fail to fully deliver what it promises.

Fourth, in order to ensure security of its equipment, the department is installing security systems, license plates, and underground tracking devices for the majority of its equipments. In some areas, the department has tracking devices on trucks as well as employees.

Finally, the IS department focuses on having a “year-by-year” starting plan for IT which describes the general framework that will guide the departmental investments. This plan varies with the change in objectives; however its main purpose is to ensure that the department is on-track throughout the whole year.

The IS department strategy attributes in this case are closest to the “defender” strategic typology since most of the strategic attributes focus on a deeper orientation rather than a wider one. The department clearly focuses on its internal environment

through investing in increasing safety measures for its employees and enhancing the security of its equipments. The IS department does not aim at increasing the scope of its operations; instead, it invests in improving its existing ones, providing reliable products and services, and acquiring superior skills in order to get better in what it is doing. The department's low tolerance to risk taking, as well as its intention to implement a formal disaster recovery plan, reflects a clear preference for a stable environment.

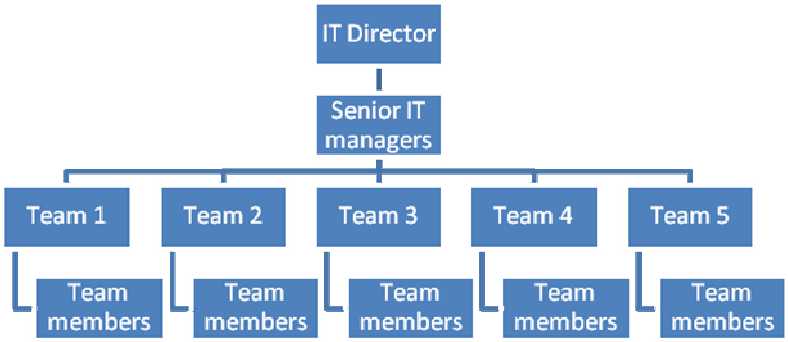
IS department structure

The IS department's employees are grouped in teams; each team includes two to three team members who report directly to a team manager. Each team manager is responsible for his group and reports to one of five "most senior IT people" in the department. In turn, all five senior IT managers report directly to the IT director. The IS department consists of four hierarchical levels (lower level employees-team members, team managers, senior IT managers, and IT director), with high levels of formality guiding their interactions.

Senior IT managers and team managers involvement in decision making is limited to decisions related to the site. Major decisions related to the department (such as allocation of resources and adopting new technologies) are made by the IT director and the vice president of operations.

Structure attributes uncovered in this case point toward a centralized framework. The department is characterized by a vertical structure with high levels of formality between the departmental personnel and many hierarchical levels. In addition, the department has a structured approach and "set criteria" for operations, which are also major characteristics of a centralized departmental structure.

Furthermore, centralization of the decision making is reflected through the importance of getting approvals from supervisors on almost all major decisions, as well as the limited involvement of the department personnel in the creation of the IS department plan. The department has three "goal levels" (overall goals, annual goals, and individual goals) that are communicated to various hierarchical levels, which further reflects its centralized structure and the limited level of involvement of the department's employees in the overall departmental planning and orientation. The diagram below displays the internal structure of GCMC's IS department.



GCMC IS department internal structure

IS department performance

The IS department evaluates its performance every six months based on three main criteria. First, the degree to which an internal pre-set list of objectives was achieved is evaluated. Each team member has a set of individual goals (3 or 4 goals). In a perfect situation, all team members achieve their goals, and therefore the department fully achieves all of its goals (which are the sum of all individual goals); in such a case, the performance of the IS department will be at 100%. Based on this evaluation procedure, the IS department achieves around 84% of its goals.

Second, organizational employees' satisfaction is another way for the department to measure its performance. The nature and the number of employees' complaints reflect their degree of satisfaction with the services provided by the IS department. Six minor complaints were reported last year; most of them reflected personal conflicts between personnel from the IS department and other departments' employees. Only one major complaint about the service of the department was reported during the same period.

Third, reliability of the products and services is also used by the IS department to measure its performance. The overall reliability of the IS department's products and services is estimated to be around 90%. Applications, e-mail system, and all networks have been 100% reliable. Due to the nature of the business, which involves working under extreme weather conditions, some issues might arise in specific sites (e.g. climate conditions interfering with wireless microwave link); however, they are always taken care of in a timely manner.

IT outsourcing

IT outsourcing reflects an external view to the way the IS department manages its relationships with its suppliers. Only 12% of the IS department budget goes to outsourcing contracts. The main functions that are outsourced by the department are the e-mail system and applications development. Some other functions that have minimal levels of outsourcing include daily maintenance and operations activities, as well as equipment monitoring responsibilities.

Around 10% of the day-to-day maintenance, 5% of operations, and 15% of equipment monitoring is outsourced to onshore suppliers. These outsourcing contracts are mostly on a need basis, and are short term contracts.

The IS department outsources all the activities related to its e-mail system to one onshore supplier. The outsourcing contract with the supplier was for a three-year period. However, it was recently renewed on a month-to-month basis. Finally, the IS department is not involved in any type of software or application development, and as such this function is completely outsourced to third parties on a need basis.

Table IV.2 reflects the identified attributes for each construct based on the description provided above.

Insights and analysis

The strategy and structure attributes of this department are closest to those of a defender strategic orientation and a centralized internal structure respectively. Two main insights about the performance of this department can be drawn. The first reflects the nature of the performance measures as well as the process of performance evaluation adopted by the department. In this case, and in light of the fact that defenders focus on their internal stable environment and urge themselves to do what they are doing in a better way, it is expected that they measure their performance based on their own set of criteria and objectives. This was noticed in all the identified performance measures (meeting internal set of objectives, no benchmarking with external environment). In addition, the evaluation process of the departmental performance reflects a centralized structure approach, whereby each manager evaluates the individual performance of his team members and reports it to his / her supervisor. Then, the head of the IS department put these evaluations together to estimate the performance of the department as a whole.

The second insight relates to the level of performance of this department. The IS department is performing best in reliability attributes (products and services are 90%

reliable, e-mail system is up 100% of the time, one major complaint reported last year, etc,); which are in line with the department's strategic goals and objectives. This enabled the department to achieve around 84% of its pre-set objectives reflecting a good overall performance indicator.

An IS department with a defender strategic orientation and a centralized structure favors stable risk-free environments, and as such outsourcing of its peripheral activities is more likely to be expected. In this case, this was reflected in the outsourcing of some of the department's maintenance and equipment monitoring activities. However, the department made sure to decrease its risk by continuously having back-up equipment available on site. Furthermore, and due to the scarcity of resources, the IS department outsources a function on which it is highly dependent (the e-mail system). Nevertheless, in order to decrease its dependence on the supplier, the IS department renews its contract with the supplier on a monthly basis so as to have the flexibility of changing suppliers if needed.

Finally, through the outsourcing of some peripheral activities, the IS department was able to focus on its core functions. Furthermore, the IS department was able to acquire excellent technological expertise and services at an affordable cost by outsourcing all of its e-mail system and its application development to an external supplier. This is reflected by the e-mail system and all the organizational applications being up and running 100% of the time, which helped the IS department achieve 84% of its internal goals and objectives.

Table IV.2 Attributes reflecting IS department strategy, structure, and performance, as well as IT outsourcing, in case 1

IS department strategy	IS department structure	IS department performance	IT outsourcing
Following a year-to-year plan	High level of formality in interaction	84% of goals are achieved	100% of e-mail system outsourced
Using proven data protection security measures	Low level of personnel involvement in the formation of a long-term plan	Products and services are 90% reliable	100% of application development outsourced
Performing regular data backups	Vertical structure	e-mail system is up 100% of the time	10% of day-to-day maintenance outsourced
Implementing disaster recovery plan	Many groups / teams within the department	Applications are up 100% of the time	5% of daily operations outsourced
Providing tools needed in emergencies	Approval from superiors on decisions	1 major complaint reported last year	15% Equipment monitoring outsourced
Improving existing operations	Set criteria for adoption of technologies	6 minor complaints reported last year	
Implementing proven technologies	Structured approach to decision making	Problems solved in a timely manner	
Acquiring superior IT skills	Centralization of decision making	No benchmarking with other IS departments is done	
Monitoring logs	Four hierarchical levels	Some specific projects experience some problems	
Comparing vendors		Occasional delays in delivery	
Getting quotes from multiple suppliers		Sometimes unavailable, especially after hours	
Implementing security devices for equipment		Employees are 90% satisfied	
Keeping a low risk profile		IS department personnel are honest	

2.2. Case 2: WBP

This case was conducted at an international company (WBP) specializing in the production of wood-based panels with oriented strand boards (OSB) as its primary product. WBP employs 2,500 persons, and has annual revenue of 1 billion U.S. dollars. It is traded on Toronto Stock Exchange, carries 1.5 billion U.S. dollars in assets, and has annual estimated sales of around 1.3 billion U.S. dollars. WBP's headquarters are located in Toronto, Canada and the company has 15 plant locations distributed around Canada, the United States, and Europe.

WBP aims at growing its line of production through producing other types of related products such as medium density fireboard (MDF), particleboards, and hardwood plywood. In addition, it is working on increasing its scope of current operations, beyond the production of only raw building material, into the production of non-core products such as a specific type or version of wood that is used for the manufacturing of furniture and related accessories.

WBP is characterized by a friendly, flexible, informal, and low-hierarchical structure with the board of directors on top of the organization. The board is composed of eight independent directors and one dependent director who is also the President and Chief Executive Officer (CEO). Four committees assist the board in its responsibilities: 1) the audit committee; 2) the corporate governance and nominating committee; 3) the environment, health, and safety committee; and 4) the human resources committee. The European and North American plants report financially to the headquarters in Toronto; however, their operations are independent.

The IS department in WBP typically employs around 20-22 persons. Due to the tight current economy, the department has recently laid off four individuals. Currently, there are 18 employees serving the IS department. The department's estimated budget, which was its actual budget for last year, was around $5 million Canadian dollars. Less than 10% of that budget goes to outsourcing, mostly to communication management and software development.

IS department strategy

The main three goals of the IS department at WBP are to: 1) provide support for the organization; 2) reduce the cost of operations; and 3) ensure infrastructure reliability. The following paragraphs reflect the strategy of the IS department by describing the course of action that it adopts in order to achieve these goals.

First, in order to provide adequate support for the organization, the IS department focuses on continuous efficient and effective operations through the implementation of current technologies that have the capability to help the business in its ongoing activities. As mentioned by the respondent *"if there is something [technology] that will help our business, we are not afraid to try it. We would like to apply proven technologies but we are not afraid to try new ones"*. There is no formal description of a plan that guides the department in achieving this goal since it is a lean and very close group, so being part of the group enables people to know what they should be doing.

Second, the IS department reduces its cost of operations by constantly searching for new internal ways through which it can use its available resources and limit the use of external help. Serving the same objective, the department invests a big portion of its

resources in improving its current operations, rather than increasing the scope of these operations.

Third, ensuring a reliable infrastructure is another key objective for the IS department. The IS department makes sure that it has a reliable, dependable and available infrastructure through constantly updating their technological tools, as well as continuously engaging in "reliability improvement projects".

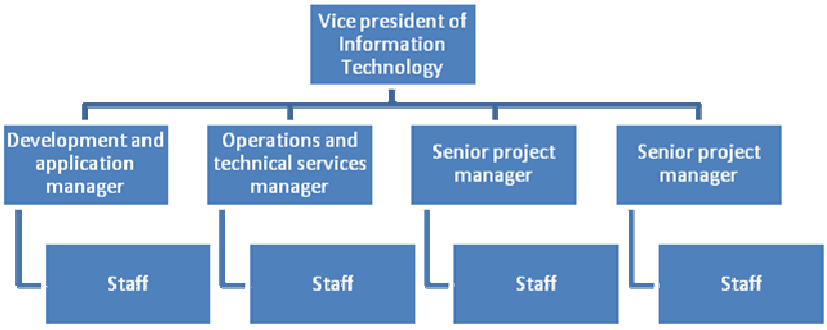
As such, the IS department at WBP aims at providing the required support for the organization. In doing so, it focuses on efficiently using its limited available resources in order to operate effectively. Furthermore, the department constantly works on improving its existing operations through using current technologies. It is not usually the first to adopt these technologies but is open to trying and exploring new options, and bearing a certain degree of risk. This is reflected by what the respondent said: "*our development work and project work is geared to supporting [business] initiatives….our big focus is improving our current operations…we are not super cautious [in adopting new technologies] we are careful"*.

The IS department strategy attributes in this case are closest to the "analyzer" strategic typology since some of its strategic attributes relate to a defender strategic typology, whereas others relate to a prospector strategic typology. For example, the IS department equally favors efficiency and effectiveness in its operations; it is not the first to adopt new technologies but it is not the last to do so either. It is also careful when considering investments in IT, yet not super cautious, which is associated with a moderate risk environment. Finally, the department focuses on improving its current operations while looking for new innovative ways for using resources.

IS department structure

The IS department follows an informal internal structure that consists of three layers. The first layer is made up of the vice president who is in charge of the whole department. The second layer includes four managers: one manager in charge of development of applications, another manager responsible for operations and technical services, and two other senior project managers. All of the managers in the second layer report directly to the vice president. The third layer includes the staff working with the managers and reporting directly to them.

The main two groups within the IS department are: 1) the operations / technical group; and 2) the development group. The first group is responsible for the company's entire infrastructure, whereas the second group looks after the applications. These two groups work together and they communicate directly with each other. The diagram below displays the internal structure of WBP's IS department.



WBP IS department internal structure

Personnel belonging to the third hierarchical level (i.e. staff members) report to the vice president through their direct managers. However, the department has an open office concept, so all departmental personnel can see and deal with each other on a daily basis in an open and informal manner. There are no big meetings in the IS department;

instead, the department has regular informal sit-down during which the personnel chat with each other, discuss their concerns, plan, and give feedback regarding the IS department.

Finally, there are two main approaches that direct the allocation of resources within the department. The first is self-initiated either by the vice president or the managers depending on the type and budget needed. The second approach requires the approval from superiors, and it usually involves decisions beyond the spending limit of the managers, or decisions regarding issues that have not been addressed before.

The IS department structure attributes reflect characteristics of centralized as well as decentralized structures. On one hand, the department has three distinct hierarchical levels and two separate divisions. The personnel have clear and identified duties and responsibilities. Superior approval on major decisions is required, and there is a structured approach for the formation of the departmental plans. On the other hand, although there is a structured approach for reporting in the IS department, it is not strictly enforced on the departmental personnel. There is low level of formality in interactions and all communications are carried out in an open and casual way. The department does not have an explicit description of the way it is administered. As such, the IS department in this case is categorized as having a hybrid structure that contains attributes of centralized as well as decentralized structures.

IS department performance

Most of the IS department's employees have been working in the company for a very long time. This culture drove away the existence of a formal approach for performance evaluation. However, some criteria that could reflect the performance of the

IS department were identified by the respondent. One criterion is the satisfaction of organizational employees. The respondent indicated that there has been no sign of any dissatisfaction form the services provided by the IS department and specified that the department gets around 30 employee support calls per day and answers most of them in the same day.

Another indicator of the IS department performance is the percentage of the objectives that are met by the department. In 2008, the IS department at WBP met around 70% of its objectives. Finally, the degree to which the department was able to deliver what it promised, while staying within the allocated budget, is used as another indicator of its performance. In this case, 90% of all the IS department projects fall within budget, while only 50% of these projects are delivered on time.

In conclusion, the IS department does not have a structured formal approach for measuring its performance. However, based on the criteria identified by the respondent, the department seems to be performing relatively well in some aspects, such as employee satisfaction, support, and cost effectiveness. Other indicators, including meeting departmental objectives and deadlines, reflect moderate levels of performance.

IT outsourcing

IT outsourcing reflects an external view to the way the IS department manages its relationships with its suppliers. Only 10% of the department budget goes to outsourcing contracts. The main two functions that are outsourced by the IS department are the communication network and software development. The department outsources all of its communication management to a single Canadian supplier, whereas software development is outsourced to two Canadian suppliers.

Furthermore, the department has minimal outsourcing arrangements (around 8%) with four main Canadian-based contractors to help with support responsibilities. These services are mainly performed on a need basis and are usually for a very short period of time.

Table IV.3 reflects the identified attributes for each construct based on the description provided above.

Insights and analysis

The strategy and structure attributes of this department are closest to those of an analyzer strategic orientation and a hybrid internal structure respectively. One of the main findings in this case study is the fact that the IS department lacks any formal evaluation criteria for its performance. This could be due to the fact that both the analyzer strategy and the hybrid structure are broad and lack a precise and narrow orientation, which is mirrored by the absence of precise performance measures.

Despite the absence of formal evaluation criteria, insights about the performance of the IS department could be inferred based on the respondent's feedback as indicated in the following examples. Answering almost all support calls within the same day reflects good performance in terms of supporting the organizational employees in performing their duties. Although 90% of the projects were within budget, 50% of these projects were delivered on time, and 70% of the department's overall objectives were met, which indicates a moderate performance level. However, upon examining the objectives of the IS department, it is noticed that these objectives are very diverse in their nature; some require a structured administration to be fully achieved (e.g. efficiency and cost

reduction), while others favor a more flexible approach (e.g. looking for innovative ways to use resources).

One observation based on this case is that when analyzers increase their scope of objectives and widen their way of administration, they risk failing to achieve a number of their goals. This is due to the fact that some activities need to be managed in a very structured way to reach a set objective, whereas other activities need to have the full flexibility in their administration in order to reach the desired goal.

The IS department does not spend much money on outsourcing and does not limit its outsourcing to a small number of suppliers. Instead, the department deals with around seven or eight suppliers. This reflects the analyzers strategic orientation in having a moderate risk level (onshore suppliers instead of offshore suppliers), while constantly considering potential alternatives (many suppliers instead of one or two).

Outsourcing network communication and application development is consistent with the findings in the literature that these two functions are expected to be outsourced the most in all companies (Fish and Seydel, 2006). However in this case, the department outsources all the management activities of the communication network function. Such a complete outsourcing of the management of an IT function also reflects an analyzer strategic orientation. Outsourcing a management activity to an external supplier is associated with a decrease in the level of stability of the department since the department becomes completely dependent on the supplier in all aspects of this respective function.

The relationship between the IS department's outsourcing and its performance is explained as follows. First, through outsourcing some of its daily activities, the IS department was able to answer all support calls in a timely manner, and managed to

provide better support to the business; this was ranked among the most important objectives of the IS department. Second, outsourcing the software and application development enabled the IS department to get the IT expertise and the up-to-date technology at a decreased cost. Third, by limiting IT outsourcing, the IS department was forced to invest its resources in some "non-core" business, which might have reduced its focus on its core objectives. Fourth, the reported delays in the delivery of projects might be associated with the limited resources available to the IS department.

Table IV.3 Attributes reflecting IS department strategy, structure, and performance, as well as IT outsourcing, in case 2

IS department strategy	IS department structure	IS department performance	IT outsourcing
Using up-to-date technologies	Structured approach for plan formulation	Absence of a formal performance evaluation	100% of network management outsourced
Lacking a formal plan for achieving goals	No formal meetings, instead "informal sit-downs"	Most of support calls are answered on the same day	100% of software development outsourced
Favoring efficiency and effectiveness	Three hierarchical levels	70% of departmental objectives are met	8% of daily services outsourced
Having a moderate risk profile	Informal interaction	90% of projects are within budget	
Looking for innovative ways for using resources	Existence of a structured reporting approach, but not strictly enforced	50% of projects meet their respective specified deadline	
Improving current operations	Open discussions		
Engaging in reliability improvement projects	Direct communication between groups in the department		
Being careful but not super cautious	Approval from supervisors is needed on "major" decisions		
	Personnel have identified, clear duties and responsibilities		

2.3. Case 3: RH

This case study was conducted at a rural hospital (RH) that has been operating for over hundred years. The hospital provides a wide range of services to the surrounding community including emergency, in-patient, diagnostic, rehabilitative, ambulatory, outreach programs, and counseling. In addition, the hospital participates in teaching programs (e.g. health care aide and student co-op), as well as community related services such as "meals-on-wheels". Around 450 employees work in the hospital, which has an annual operating budget of 30 million Canadian dollars for 2008 / 2009.

The hospital's main two goals are to provide excellent health care, and improve the health of the community. RH aims at achieving these two goals through: 1) providing high quality of care; 2) respecting patient individual rights; 3) involving patients in their care; 4) improving patient safety; 5) favoring innovation and support; and 6) responding to external factors. As such the hospital has an internal orientation that focuses on improving its operations and providing excellent services for its clients, as well as an external one that favors innovations and growth.

RH follows a vertical structure with the board of directors on top of the hospital. The board is composed of twelve directors who elect a chair, a vice chair, a treasurer, and a secretary of the board. The treasurer acts as the chair of finance and property committee; and the secretary is the president and chief executive officer (CEO) of the hospital. The CEO is also the head of a senior management team, which is composed of vice presidents (VPs) and two other directors. There are around 20 departments in the hospital, each of which has a department head reporting directly to the senior management team.

The IS department was developed nine years ago; at that time, it used to employ only one person. Since then, the department has developed and now it employs three persons: the IT director, a Picture Archiving and Communication System (PACS) administrator, and a part-time employee. The estimated IS department budget for this year is around CAD $200,000; the actual budget until February 2009 was around CAD $120,000. The IS department is responsible for serving all other departments in the hospital.

IS department strategy

The main three goals for the IS department are: 1) to provide adequate support to the user community; 2) operate in a risk free environment; and 3) to ensure integrity and security of data.

First, the IS department achieves its first goal (providing adequate support for the user community) by making sure to do things right the first time, and sharing information regarding issues that were resolved. Furthermore, the department offers a one-to-one training to organizational employees as part of its focus on the support for the user community. All this enables the department to be more efficient in its operations and free some of its scarce resources in order to be able to provide better support services for the organizational personnel.

Second, in order to avoid a lot of the pitfalls of new technologies, the IS department makes sure to wait until a new technology is proven and fully tested by others before adopting it. The monthly meetings of the CIOs of hospitals belonging to the Local Health Information Network (LHIN) are great resource for the IS department in that sense. Typically, the IT director attends meetings sponsored by the LHIN and gets input

and feedback from other CIOs who have already adopted new technologies in their institutions. This enables the department to achieve its second goal of operating in a risk free environment.

Third, the IS department ensures the integrity and security of the data (such as patients' information, results, medical records, etc.) through implementing strict rules for access to these data and closely watching any breaching attempts. Furthermore, the IS department continuously monitors its firewalls in order to make sure that all its data are safe from intruders.

In addition to the above mentioned goals, the respondent identified some departmental "ongoing goals" including: moving into virtual memory wire, virtual server, and thin client; and developing a clear long-term departmental plan. The respondent specified that *"these are on-going goals and are out of reach at present but they remain as goals for the department"*. He indicated that the IS department is not currently working toward achieving these goals for a number of reasons such as the economic crisis and the limited available resources.

In summary, the IS department strategy attributes in this case are closest to the "defender" strategic typology. The department clearly focuses on its internal environment by providing better support and training for its user community, and ensuring efficiency in its operations. It favors a stable, controlled, and risk free environment; only proven and tested technologies are adopted, and as such it is among the later group in its industry to adopt new technologies.

IS department structure

The IS department consists of three employees: an IT director, a PACS administrator, and a part-time technician. There is no formality in the department, and meetings and assignments of duties are held in an informal way. Employees communicate directly with each other in an open and friendly manner. The physical layout of the IS department provides an open environment; the department personnel share the same work space and each has his / her own desk in that area.

All the personnel are involved in one major IS department responsibility i.e. user's support. As such, everyone in the department, including the IT director, share the responsibility of answering calls and supporting the user community. Although there is a reporting structure, no hierarchy exists in the department. Aside from vacation requests and prioritizing issues to address, internal decisions are made jointly involving all departmental personnel.

The channel for major decision making, such as the adoption of a new technology, usually starts with the IT director attending the LHIN meetings. Based on these meetings, the director presents his observations and recommendations to the organizational team of senior management, who discuss these recommendations and give their final approval. Upon approval by the senior management team, the IT director transmits this decision to the IT department and assigns related needed tasks to the departmental personnel on top of their daily routine activities.

In summary, the IS department is characterized by a decentralized structure, with decision making being shared by all employees. In addition, flexibility, lack of hierarchy,

and informality, and short-term commitment (part-time employees) are clear characteristics of the IS department in this case.

IS department performance

The IS department estimates its overall performance at 80% based on the following criteria: 1) number of unanswered calls from the user community; 2) number of call-backs regarding the same issue after being resolved; 3) number of projects falling within budget and delivered on time; 4) organizational employees complaints; 5) number of breaches to the firewall; and 6) other departments' feedback regarding the IS departments services.

First, the IS department receives around 60 support calls per day, which can range from "I don't know how to use a system" or "I can't access a specific file" to "my monitor is not turning on" etc. Out of these 60 calls, around four to five call requests are not addressed on the same day, and are postponed to the next day (i.e. 7.5% of the user support calls are not handled within the same day).

Second, the respondent estimated that around 4% of the total number of calls represents recurrent calls. He highlighted that this number have been much higher during the last couple of months since the department is implementing a new firewall that is in conflict with the existing one. As he indicated: *"we are getting a lot of re-calls regarding this same problem, so it is a known problem that we are addressing and fixing but it is making the repeated calls for the same problem much higher than typically are"*.

Third, although the IS department's projects usually fall within budget and time, in some cases finalizing a project is tied to a third party, which might affect its delivery and lead to some delays. The respondent gave the following example to illustrate his

point: *"we wanted to implement a voice recognition system for radiology, and there was a problem between our PACS system and the dictation system, so we had to wait for the PACS system to validate that they would support this version of the dictation system, ... the project as a whole was delayed"*.

Fourth, the complaints from the employees in the organization represent another way for the department to evaluate its performance. The respondent estimated that around 80% of the employees are satisfied with the department's service. However, he further indicated that the remaining 20%, although not fully satisfied, are not strongly dissatisfied as to take their complaints to the next level and report them to higher authorities in the organization.

Fifth, measuring the performance of the IS department is also done through monitoring the number of breaches to the firewall. The IS department captures 100% of the attempts to breach its firewall (typically there are around 100 attempts per day). The majority of these attempts are "non-malicious" income traffic and they are all blocked.

Finally, the IT director noted that various departments in the hospital have their own satisfaction surveys that they conduct in order to know the satisfaction of their employees with respect to their respective department, as well as with other departments. One of these surveys was done with respect to the IS department, and the results showed that the majority of the employees are satisfied with the services of the department. A major demand that was identified involved scheduling training sessions for other departments' personnel. Subsequently, the IS department accommodated this request and a follow-up survey after the training session showed that the employees were very happy with the service.

In conclusion, the IS department is performing well in terms of its main objectives and goals. It is serving its community reasonably, the employees are generally satisfied from its services, and it is operating at high efficiency. However, the department seems to be a little bit behind in meeting deadlines and fixing major problems (e.g., the conflicting firewalls), which are leading to recurrent support calls.

IT outsourcing

IT outsourcing represents an external view to the structure of the IS department with its suppliers. While the IS department structure demonstrates the internal way through which the department is administered, IT outsourcing defines the way through which the IS department manages its relationship with its suppliers.

None of the main responsibilities of the IS department (e.g., providing support to the user community, securing data, etc.) is outsourced except in very extreme cases when the department does not have the resources to complete the work. For example, last year the only activity that was outsourced was the installation of physical cabling and wiring of a new implemented infrastructure. Once the physical cabling was done, the department took over and set up the rest of the infrastructure.

Furthermore, all IT operations and maintenance are done in-house. However, the IS department is not involved in any application development; all applications along with their support packages, are acquired from third party. As such, IT outsourcing in the IS department is limited to application development, and some very limited infrastructure installation.

Table IV.4 reflects the identified attributes for each construct based on the description provided above.

Insights and analysis

Prior research has shown that a centralized structure is usually observed with a defender strategic orientation (Aubert et al., 2008). However in this case, the majority of the strategy and structure attributes reflect a defender and a decentralized structure, respectively. Two main lessons can be learnt from this case regarding the relationship between the department's strategic orientation, its internal structure, and its performance.

The first lesson is that when the IS department have conflicting strategy and structure attributes, as it is in this case study, strategy attributes have more weight in determining the type of prevailing performance measures used by the IS department. On one hand, the decentralized structure of the IS department under study is expected to favor innovations, originality, breakthrough products, and growth of the scope of operations, which were not observed in this case. On the other hand, the defender strategy of the IS department suggests an internal focus on customers, self benchmarking, improvements and efficiency in current operations. All of these performance criteria were found in this case; examples include employees' satisfaction, number of recurrent calls, data storage, and number of firewall breaches.

The second lesson is that the conflicting strategy and structure attributes hinder the department from reaching high levels of performance. The IS department in this case is performing well since most of its performance indicators are in the 90^{th} percentile. However, some performance measures, such as employee satisfaction, and more importantly the overall performance of the department do not reflect very high levels of performance.

The IS department in this case study reported very low levels of outsourcing of both IT operations and maintenance. This is consistent with the defenders' approach of focusing on stability and favoring risk-free environments since outsourcing the operations, maintenance, or management functions will put the IS department in an unstable environment where it is constantly dependent on a third party for its daily activities. However, by fully outsourcing the development of its applications, the IS department is able to decrease its operating costs (hence be more efficient), improve its operations by having access to new technologies, and focus on its immediate environment and community.

Finally, since all applications development activities were outsourced, the IS department was indeed able to focus on its "core business". The department was able with three employees to support 92.5% of the user communities calls, ensure that there is not a single breach to its firewall, and satisfy 80% of the employees.

Table IV.4 Attributes reflecting IS department strategy, structure, and performance, as well as IT outsourcing, in case 3

IS department strategy	IS department structure	IS department performance	IT outsourcing
Doing things right the first time	Two hierarchical levels	Performing at 80%	100% of application development outsourced
Sharing information	No formality in interaction	92.5% of calls are answered the same day	minimal infrastructure installation
Training organizational employees	Open environment	96% of calls are non-recurrent issues	
Implementing strict data access rules and watching breaches	Sharing of most responsibilities	20% of employees are moderately satisfied with the services	
Improving existing operations	Sharing of office space	80% of employees are fully satisfied with the services	
Adopting proven technologies	Decentralization of decision making	100% of breeches to firewall are blocked	
Focusing on efficiency	Short-term commitment (part-time position)	Projects cost less than their estimated budget	
Monitoring firewalls	Flexibility	Projects are not always delivered on time	
Keeping a risk-free profile		A problem with the firewall has been there for couple of months	
Developing a long-term plan (ongoing goal)			
Following other IS departments in the industry (ongoing goal)			

2.4. Case 4: TESC

This case was conducted at a publicly traded transportation and environmental services company (TESC). TESC is among the largest full-service airlines in Canada with more than 300 aircrafts offering direct passenger transportation services both nationally and internationally on five continents. The company is traded on Toronto Stock Exchange and employs around 25,000 employees.

TESC focuses first and foremost on its customers. In addition to its primary focus on the safety of its customers, the company aims at building customer appreciation and long-term loyalty through continuously addressing its customers' needs and providing them with a wide range of innovative and unique products and services. The company achieves this through: innovation and cost reductions. On one hand, the company invests in innovating new products, services, and offerings in order to secure and increase its customer base. On the other hand, TESC continuously focuses on the efficient use of resources, the acquisition of highly efficient tools, and the continuous improvement of its current operations.

The information systems (IS) department in TESC employs around 60 employees, and outsources the majority of its IT activities and services to external vendors. As such, around 90% of the department's budget goes to outsourcing with the main responsibilities of the IS department being: vendor management, technology roadmap development, and customer relationship.

IS department strategy

The major four goals of the IS department at TESC are to: 1) provide the business with reliable and adequate services; 2) provide IT services at the right price; 3) ensure

continuous operational improvement; and 4) meet other organizational employees' expectations of evolving their systems. In order to achieve these goals, and in light of the fact that TESC outsources the majority of its IT services, the IS department makes sure that its goals are clearly communicated to its vendors. The following paragraphs reflect the strategy of the IS department by describing the specific course of action that it adopts in order to achieve these goals.

First, in order for the IS department to make sure that it is providing the business with adequate and reliable IT services, the department analyzes its current status and decides where it wants to be in five years. Once this analysis is done, the architects in the department identify the specific technology needed to support the departmental orientation. The department requires that the architects' knowledge be constantly up-to-date in order to be qualified to fulfill this responsibility. The identification of the technology needed can take an inward orientation, through "technology scans", or an outward one through "business needs". On one hand, technology scans take place continuously through the IT architects as well as every quarter whereby the IS department asks the vendors about their new developments. By doing so, the department makes sure that it is well informed about the latest technologies that are available to support the departmental orientation. On the other hand, business needs occur when a part of the business requires a solution for a certain problem or an alternative way to its current practice; as such, the need is the major driver for the identification of the right technology.

Second, the IS department invests a lot of effort and resources towards improving the efficiency of its operations in order to ensure that the services are being offered at the

right cost. One example is the introduction of mobile applications through which once employees finish a specific task they are directly assigned a next one through their mobile devices without having to go back to their supervisors to inquire about what to do next.

Third, the IS department guarantees improvement in its current operations through its constant involvement in a problem solving approach and its continuous strive for excellence in all of its operations. As such, if a system is running at 96% availability, the department looks for the reason why it is not performing at 97%, and once the reason is identified, a business case is presented and a mitigation plan is implemented.

Fourth, in order to ensure that the IS department meets the expectation of its customers, the department monitors the performance of its vendors on regular basis. In addition, it enforces strict service level agreements (SLAs) in the outsourcing contracts, which forces the vendors to meet their obligations towards the organizational employees.

The IS department also focuses on having a high availability environment (e.g. dual entry of power, dual entry of all the services, air conditioning with five generators), as well as disaster recovery plans for certain key applications. Furthermore, the department favors a moderate-to-low risk level and prefers to wait until a technology "settles down" before adopting it. Specifically, the respondent stated that: *"we don't like to be on the bleeding edge but the leading edge… we [adopt a new technology] probably soon after the wow! it is completely new"*.

The IS department strategy attributes in this case are closest to the "analyzer" strategic typology. The department has three main foci: 1) strive for excellence and improvement of operations through architects' knowledge, technological scans, problem solving approach, and continuous monitoring of the quality of the vendors' products and

services; 2) cost reduction through implementing innovative procedures that are able to improve efficiency, and 3) performing environmental scans and keeping its human resources up-to-date. Finally, the department's medium tolerance to risk taking, as well as its focus on a high availability environment and the implementation of a disaster recovery plan, reflects its focus on a safe and stable environment while paying enough attention to the external environment and staying up-to-date with technology.

IS department structure

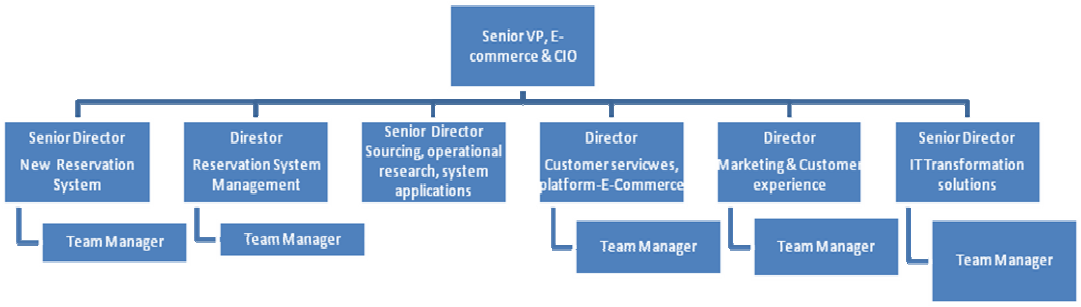
The IS department's employees are grouped in six teams. Team members report to a team manager, who reports to a team director. Each team director is responsible for his group and reports directly to the CIO. As such, the IS department consists of a vertical structure made up of four hierarchical levels (team members, team managers, directors, and CIO), with medium levels of formality guiding their interactions.

Decisions regarding the allocation of resources are made collectively by all directors. Once the CIO gets the formal budget for the IS department, the directors meet with the CIO and decide on where to allocate these resources within the department.

Informal meetings are common and take place in the department all the time on a need basis. However, formal meetings between the directors and the CIO are scheduled every other week in order to keep the directors informed about any corporate news. Directors meet their deputies every other week in order to transmit any corporate news to them. Furthermore, each director meets with all his / her team members every two months to make sure that everyone knows what others are doing and share information.

Structure attributes uncovered in this case point toward a hybrid structure. Although centralized structure attributes are more abundant in this IS department (e.g.

top-down structured reporting approach, clear distribution of responsibilities, existence of four hierarchical levels), still these attributes are shared with decentralized ones. For example, it is a very friendly environment with low level of formality in interaction between members of different hierarchical levels. Furthermore, informal meetings are very common and all the department personnel are highly empowered to communicate and get information from each other directly at any time. The diagram below displays the internal structure of TESC's IS department.



TESC IS department internal structure

IS department performance

The performance evaluation criteria adopted by the IS department revolve around three main areas: vendor management, ability to work with the vendors to improve operations, and customer satisfaction.

First, the IS department evaluates its performance in vendor management in terms of cost efficiencies, staying within budget, completeness of contracts, and the degree to which the vendors meet their obligations. The IS department is meeting its budgetary targets 100% of the time although it is always "doing more with less money", which also reflects its high cost efficiency. Furthermore, the department has a lot of SLAs in the contracts which force the vendors to meet their obligations; otherwise they have to pay a

lot of money and as stated by the respondent "*they don't like to give us back any money so they make sure to always meet their obligations*". Specifically, the vendors are meeting all their obligations in operational, security, and safety areas. However, in non-operational areas the vendors are meeting their overall obligations since the department is more open to adjustments that would meet the needs of more companies. The department also relies on the feedback from the organizational employees about the performance of the vendors. In that sense, the department gets very occasional escalation calls about dissatisfaction with the vendors' performance but these calls are very exceptional.

Second, the IS department measures its ability to work with its vendors and improve current operations through the variations in the number and duration of outages, as well as the extent of recurrence of problems. The respondent indicated that the number of outages and the recurrence of problems by itself is not a measure of the departmental performance, since the department is not the one performing the service; however, the increase or decrease in these numbers reflects the department's performance in vendor management. As such, the respondent indicated that the number of outages keeps on decreasing and becoming shorter, and the recurrence of similar problems is constantly going down.

Third, the IS departments identifies the organizational employees as its customers and estimates their satisfaction as being stable and average. The respondent highlighted that customer satisfaction is average because the department is constantly doing more things with fewer resources. Specifically, she stated that: "*Customer satisfaction is average but my colleagues understand that when your PC breaks I could have someone there in 10 minutes, 2 hours, or the next day… but they all understand that to have*

someone there in 10 minutes it means that there is a person sitting down the hall waiting for it to break and there is a cost for that … so my colleagues understand it, are they pleased? No; is it adequate? Yes"

Finally, major key applications are up 99.99% of the time excluding one or two 15 minutes every other month allocated for system maintenance. However, the respondent highlighted that the department has "*to prioritize, and investments are in line with the impact and kind of outage they could have*".

IT Outsourcing

Around 90% of the IS department budget goes to outsourcing contracts. The department outsources its IT activities to onshore as well as offshore vendors. Furthermore, the IS department favors long-term contracts with its vendors due to: 1) high costs associated with identifying the right vendor and implementing a new contract, 2) ability to negotiate better deals for long term contracts; and 3) duration required to have an adequate and efficient return on investment from these contracts. The department overcomes the risk associated with long-term commitment to the vendors by having very strict SLAs in the contracts that force the vendors to meet their obligations.

Table IV.5 reflects the identified attributes for each construct based on the description provided above.

Insights and analysis

The strategy and structure attributes of this IS department are closest to those of an analyzer strategic orientation and a hybrid internal structure, respectively. One of the main findings in this case study is that the department is focused with clear priorities and an internal as well as an external orientation. This IS department manages to work on

efficiency and improvement of current operations along with emphasis on technology scanning and innovations. Furthermore, structure attributes reflect the characteristics of a centralized structure (top-down structure, four hierarchical levels, structured reporting approach) as well of a decentralized structure (direct communication, major decisions made collectively) leading to a hybrid overall departmental structure existence of formal and informal meetings, medium formality).

The second finding in the case study is that the IS department has an average performance in relation to customer satisfaction. This might be explained by the present economic situation that, as highlighted by the respondent, forces the department to prioritize cost reductions over customer satisfaction.

Another very interesting lesson observed from this case study relates to the analyzer strategic orientation in outsourcing. An analyzer department favors some level of outsourcing and tries to mitigate the instability accompanying the outsourcing of IT activities and the complete dependence on external vendors. In this case study, the majority of the IT activities were outsourced to onshore as well as offshore vendors. The IS department in this case is very focused and clear on its priorities, and its outsourcing arrangements fit very well with its strategic orientation.

There are a lot of operations taking place at TESC, and the IS department aims at getting high technological expertise and continuously decreasing its costs. The department was able to mitigate the instability associated with outsourcing, as well as the high levels of dependency by investing in long-term contracts and implementing strict SLAs. As such, it continuously improves its operations, with the help of technology scans

offered by experts in the field at an affordable price, and maintains a stable and secure environment through long-term contracts and strict SLAs.

Table IV.5 Attributes reflecting IS department strategy, structure, and performance, as well as IT outsourcing, in case 4

IS department strategy	IS department structure	IS department performance	IT outsourcing
Having a formal plan for achieving goals	Clear departmental structure	Always doing more work with less resources	90 % of IT budget goes to outsourcing
Improving current operations	Clear distribution of duties and responsibilities	Exceptional escalation calls regarding vendor performance	Long-term contracts
Performing technology scans	Top-down structure	Number and duration of outages going down	Offshore and onshore vendors
Encouraging up-to-date employee knowledge	Existence of a structured reporting approach	Vendors meet their obligations 95% of time	Strict SLAs
Responding to business needs	Medium formality in interactions	100% of projects are within budget	
Striving for excellence	Four hierarchical levels	Number of recurrent problems going down	
Having a problem solving approach	Direct communication between groups	Average customer satisfaction	
Waiting for the technology to settle before being adopted	Major decisions made collectively	Major applications provided by vendors are up 99.99% of time	
Looking for innovative ways for increasing efficiency	Existence of formal as well as informal meetings		
Favoring efficiency and effectiveness			
Enforcing strict SLAs			
Favoring moderate to low risk profile			
Having disaster recovery plans			
Monitoring vendors operations			

2.5. Summary of the findings from the case studies

Figure IV.1 presents a summary of the findings from the four case studies. The IS departments in the mining and the airline cases invested heavily in focusing on both strategy and structure attributes. For example, both of these departments had a clear and formal plan that they followed in order to achieve their desired goals. The majority of the strategy attributes identified in these two departments reflected a clear focus and direction towards achieving the department's goals. Furthermore, although these two departments differed in the orientation of their internal structure (i.e. structure attributes in the mining and airline cases being close to the attributes of a centralized and hybrid structure, respectively), they both demonstrated a high focus on their internal structure. For instance, the degree of formality in interaction within these two IS departments may differ. However, the importance, consideration, and effort in achieving the desired degree of formality were highly emphasized in both departments. As such, the philosophy of the IS department in the mining and the airline cases may be summarized as "we know what we want, we know what we need to do to get what we want, and we follow a specific procedure in the process".

The IS department in the healthcare case focuses more on the strategic attributes than the structure ones. For example, on one hand, the department was developing a long-term plan, made sure to do things right the first time and to enforce strict security measures that ensure integrity of its data. As such, the strategic component was highly emphasized by this IS department. On the other hand, the structure dimension was not highly addressed in this IS department. For instance, although there were two identified hierarchical levels, the boundaries of these two levels were never addressed. Sharing of

responsibilities is another indication of the lack of focus on the departmental internal structure. As such, the IS department's philosophy in the healthcare case may be summarized as "we know what we want, we know what we need to do to get what we want, and we do not care about having a procedure to follow in the process".

The IS department in the manufacturing case focused on the way of doing things much more than on the things that are done. For example, this department had a structured approach for plan formulation, yet it did not have a plan. Furthermore, the IS department had three hierarchical levels, as well as identified and clear responsibilities. Nevertheless, its strategy attributes were not orchestrated towards any identified orientation. As such, the IS department's philosophy in the manufacturing case may be summarized as "we are not sure of what we want to do, but we want to follow a specific approach when we do anything".

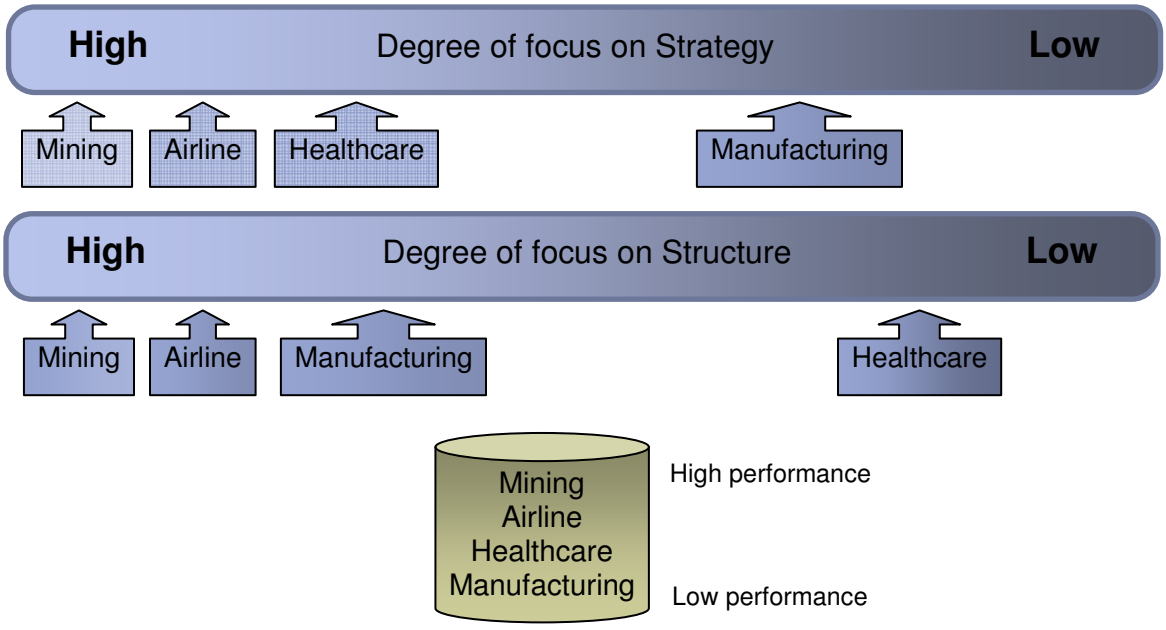


Figure IV.1 Summary of the findings on the IS departments strategy, structure, and performance from the four case studies

2.6. Implications of the qualitative phase on the research project

The case studies revealed strategy and structure attributes that are specific to the IS department, as well as the existence of various profiles of IS departments based on these attributes. Furthermore, the case studies showed differences in the performance of IS departments in relation to their existing strategy and structure. Nevertheless, they did not reveal any significant differences in the degree of IT outsourcing although differences were noted between the cases in relation to the IS department strategy and structure. This may be due to the fact that outsourcing decisions are made at the organizational level. As such, a revision of this research project's propositions was done and proposition 3, which links the IS department configurations to different levels of IT outsourcing, was dropped. Consequently, IT outsourcing will be treated as a control variable in the subsequent analysis in the quantitative phase of this research. Hence, the propositions that will be addressed in the remaining sections are:

Proposition 1: IS departments' strategy and structure attributes cluster together to form distinct IS department configurations.

Proposition 2: IS departments with various IS department configurations will be associated with different IS department performance levels.

Furthermore, Figure IV.2 presents the revised research model after removing the IT outsourcing component. This model illustrates an example of an IS department configuration that would emerge from the mapping of the strategy and structure attributes, along with the relationship between this specific configuration and the performance of the IS department.

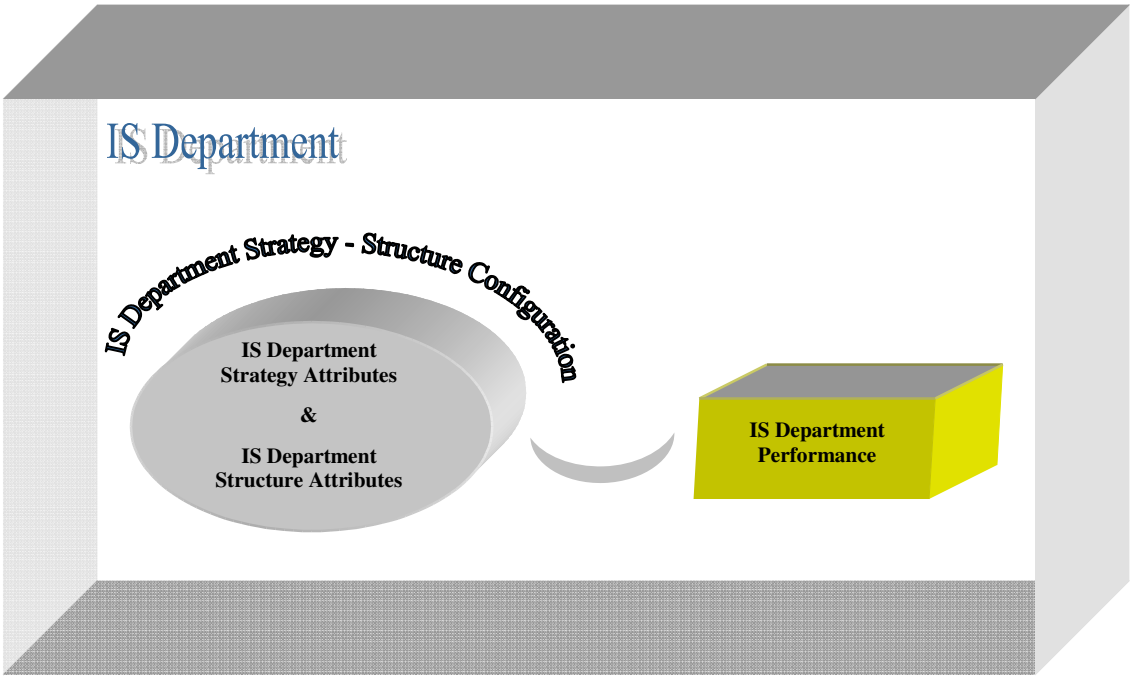


Figure IV.2 Revised research model

CHAPTER V: QUANTITATIVE PHASE

1. Methodology

1.1. Instrument development

Based on the results of the case studies and the literature review, a set of questions reflecting the constructs under study were developed. Furthermore, additional items that were used in previous studies, and which relate to the current research, were adopted to ensure comprehensiveness of the scales.

The essential steps involved in the instrument development, as indicated by Moore and Benbasat (1991), were followed. First, the card sorting technique was used to identify any ambiguity and assess construct validity. Once all items were identified and phrased appropriately to reflect the constructs under study, a focus group of six experts in the field were presented with five envelops labeled "IS department strategy", "IS department structure", "IT outsourcing", "IS department performance", and "Not applicable". A separate envelope containing all the items (each on a separate small piece of paper) was also given to the respondents who were asked to place each item in the envelope to which they believed it best belongs, and put items that were unclear or reflecting two or more concepts in the "Not applicable" envelop. Once all responses were collected, Cohen kappa was calculated for all the items. Items in the not applicable envelope were either removed or rephrased to eliminate ambiguity.

Based on the card sorting exercise, six questions were identified as unclear, and subsequently reworded to eliminate ambiguity. These questions referred to the presence of a plan within the IS department, improvement in the quality and efficiency of its operations, increase in the number of its services, involvement of its personnel, and the

decision making process. Furthermore, five other questions were deleted due to major disagreement between the judges on the construct that they reflect. These questions were related to performing data backups; enforcing service level agreements with vendors; updating hardware; evaluating the IS department's performance; and increasing resources in order to improve departmental performance. The overall level of agreement between participants in the card sorting exercise was 0.90 as indicated by the Kappa coefficient of agreement. Specifically, the agreement on the set of questions within each category was as follow: IS department strategy questions (Kappa = 0.85); IS department structure questions (Kappa = 0.94); IT outsourcing questions (Kappa = 0.94); and IS department performance questions (Kappa = 0.88).

Following the card sorting exercise the items included in the survey were formatted and pre-tested with nine experts in the field. Specifically, these experts were asked to provide their opinions and feedback about the instrument (e.g., length of the instrument, format of the scales, content validity of the constructs, and clarity of the questions). Based on their input and recommendations, minor modifications were incorporated to improve the instrument. Table V.1 presents the final list of questions included in the survey along with their respective sources.

Table V.1 List of survey questions based on the literature review, the case studies, and pre-testing of the survey instrument

Construct: IS department strategy *The determination of the basic long-term goals and objectives of an IS department and the adoption of courses of action and the allocation of resources necessary for carrying out these goals (based on Chandler's (1962) definition of "business strategy")*		
Dimension 1 – Proactiveness: The degree to which the IS department adopts a proactive behavior in relation to continuous search for new technologies and experimentation with potential responses to changing technological trends		
1.	The IS department follows specific criteria when acquiring new information systems (rev) (Q9_P3)	Pre-testing
2.	The IS department waits for technologies to mature before adopting them (rev) (Q2_P2)	Case studies 1,2,3,4
3.	The IS department uses technologies that allow quick adaptation to environmental changes (Q10_P4)	Segev_1987; Parnell (1997); Sabherwal et al. (2001) ; Bergeron et al. (2004)
4.	The IS department performs technology scanning to identify any potential IT that can be implemented in the organization (Q11_P5)	Bergeron et al. (2004) Case studies 3,4
5.	The IS department has a technology scanning approach institutionalized in order to change rapidly its IT when necessary (Q12_P6)	Segev_1987; Parnell (1997); Bergeron et al. (2004)
6.	The IS department strives to adopt leading edge technologies (Q1_P1)	Segev_1987 ; Bergeron et al. (2004) Case studies 1,2,3,4
Dimension 2 – Risk awareness: The degree of riskiness reflected in the decision making of the IS department and its allocation of resources		
7.	The IS department has a complete disaster recovery plan (Q16_R5)	Case Studies 1, 4
8.	The IS department completed the implementation of its disaster recovery plan (Q17_R6)	Pre-testing
9.	The IS department maintains a low risk management approach (Q13_R2)	Segev_1987; Parnell (1997) Case studies 1,2,3,4
10.	The IS department offers risk-free IT solutions (Q5_R1)	Case study 4

11.	The IS department has a policy in place that outlines the need for security and confidentiality (Q15_R4)	Pre-testing
12.	The IS department has very strict security measures in place to protect its IT environment (Q14_R3)	Case studies 1,3
Dimension 3 – Defensiveness: The extent to which the IS department behavior emphasizes cost reduction and efficiency while focusing on its specific domain		
13.	The IS department makes every effort to improve the quality of the services that it provides (Q3_D1)	Segev_1987; Parnell (1997); Bergeron et al. (2004) Case studies 1,2,3,4
14.	The IS department works on developing innovative approaches to operations (rev) (Q7_D4)	Segev_1987; Parnell (1997); Bergeron et al. (2004) Case studies 2,4
15.	The IS department makes every effort to increase the number of services that it provides (rev) (Q4_D2)	Segev_1987; Parnell (1997); Sabherwal et al. (2001) Case studies 1,2,3,4
16.	The IS department works on increasing the efficiency of its operations (Q6_D3)	Segev_1987; Parnell (1997); Sabherwal et al. (2001) ; Bergeron et al. (2004) Case studies 1,2,3,4
17.	The IS department hires new skills and talents on a regular basis (rev) (Q8_D5)	Bergeron et al. (2004) Case studies 1,2,3,4
Construct: IS department structure *Design of organization through which the IS department is administered (based on Chandler's (1962) definition of "organizational structure")*		
Dimension 1 – Centralization: The distribution of authority and decision-making in the IS department		
18.	Within the IS department, there is a centralized administrative structure (Q18_C1)	Case studies 1,4
19.	IS department personnel are kept updated on current IT projects in the department (rev) (Q30_C5)	Case studies 1,2,3,4
20.	Within the IS department, communication on job related matters is predominantly vertical (Q22_C3)	Zanzi (1987)
21.	Within the IS department, top IS executives make all major decisions (Q19_C2)	Hage and Dewar (1973);

		Montanari and Freedman (1981); Menon et al. (1999) Case studies 1,2,3,4
22.	IS department personnel have to get an approval from their supervisors on decisions they make (Q27_C4)	Hage and Dewar (1973); Deshpande and Zaltman (1982); Menon et al. (1999) Case studies 1,2
Dimension 2 – Formalization: The degree to which rules and policies govern the IS department and the extent to which it exercises control to enforce them		
23.	Within the IS department, there is / are _____ hierarchical level(s) (Q73_F9)	Case studies 1,2,3,4
24.	IS department personnel have to follow a systematic approach when making daily decisions (Q28_F7)	Deshpande and Zaltman (1982); Menon et al. (1999)
25.	Within the IS department, there is documentation that describes the departmental internal structure (Q24_F4)	Case studies 2,3,4
26.	Within the IS department, there is documentation that represents the departmental rules and policies (Q25_F5)	Case studies 2,3,4
27.	IS department personnel have clear detailed job descriptions (Q26_F6)	Zanzi (1987); Montanari and Freedman (1981); Deshpande and Zaltman (1982) Case studies 2,3,4
28.	IS department personnel communicate through formal channels (Q29_F8)	Hage and Dewar (1973); Deshpande and Zaltman (1982); Menon et al. (1999) Case studies 2,3,4
29.	Within the IS department, lower level employees have to follow a formal procedure to communicate with top IS executives (Q20_F1)	Case studies 1,2, 3,4

30.	Within the IS department, lines of authority are precisely defined (Q23_F3)	Zanzi (1987) Case studies 1,2,4
31.	Within the IS department, Lower level employees communicate with top IS executives through their direct manager only (Q21_F2)	Case studies 1,2,3,4
Construct: IS department performance *Success in meeting the IS department's pre-defined objectives and goals*		
Dimension 1 – Effectiveness: The extent to which the IS department achieves its goals and objectives.		
45.	The IS department delivers IS services on time (Q43_E1)	Pitt et al. (1995); Harrison-Walker (2002); Ray et al. (2005); Chang and King (2005); DeGroot and Brownlee (2006) Case studies 1,2,3
46.	The IS department delivers IS services on budget (Q44_E2)	Pre-testing
47.	The IS department delivers IS services to the desired quality (Q45_E3)	Pre-testing
48.	The IS department achieves its yearly goals (Q46_E4)	Chang and King (2005); DeGroot and Brownlee (2006) Case studies 1,2,3
49.	The IS department blocks breaching attempts to its firewalls (Q55_E6)	Case study 3
50.	The IS department fulfills service level agreements (SLAs) with different business units in the organization (Q54_E5)	Case studies 1,4 Pre-testing
Dimension 2 – Reliability: The degree to which the IS department performs IT services dependably and accurately		
51.	IS department personnel face recurrent IT-related problems (rev) (Q57_RL5)	Case studies 3,4
52.	IS department personnel are able to solve all the organizational IT-related problems (Q59_RL6)	Pitt et al. (1995); Harrison-Walker (2002); Ray et al. (2005); Chang and King (2005)

53.	The IS department personnel are willing to stay after-hours if needed (Q60_RL7)	Case studies 1,3
54.	The IS department delivers error-free services (Q47_RL1)	Ray et al. (2005); Chang and King (2005) Case studies 1,4
55.	The IS department collect metrics to identify the areas in its operations that need improvements (Q52_RL4)	Pre-testing
56.	The IS department does what it promises to do (Q48_RL2)	Parasuraman et al., (1985) SERVQUAL
57.	The IS department performs IS services accurately the first time (Q49_RL3)	Ray et al. (2005) Case study 3
Dimension 3 – Responsiveness: The degree to which the IS department communicate with other organizational employees and provide them with prompt IT services		
58.	The IS department informs other departments' employees about the exact delivery date of IS services that involve them (Q50_RS1)	Pitt et al. (1995); Harrison-Walker (2002) Pre-testing
59.	The IS department informs other departments' employees about the exact delivery date of IS projects that involve them (Q51_RS2)	Pitt et al. (1995); Harrison-Walker (2002) Pre-testing
60.	IS department personnel solve all support calls that they receive per day (Q56_RS4)	Pre-testing
61.	The IS department receives complaints from employees of other departments within the organization(rev) (Q53_RS3)	Case studies 1,2,3
62.	IS department personnel are too busy to respond to users' requests (rev) (Q61_RS6)	Parasuraman et al., (1985) SERVQUAL
63.	IS department personnel respond to organizational employees' requests promptly (Q58_RS5)	Parasuraman et al., (1985) SERVQUAL

1.2. Survey sections

The final survey included four pages (four sections) that assess the constructs under study in this research project (Table V.2), as well as general information about the respondents and their respective IS departments and organizations. The four sections in the order they appear in the questionnaire are: 1) IS department strategy; 2) IS department structure; 3) IS department performance; and 4) organizational and respondent profiles. Copies of the cover letter as well as the mailed survey are presented in Appendix H.

Table V.2 Overview of the main constructs and final number of questions included in the survey instrument

Construct	Definition	Measurement
IS department strategy	The determination of the basic long-term goals and objectives of an IS department and the adoption of courses of action and the allocation of resources necessary for carrying out these goals (based on Chandler's (1962) definition of "business strategy")	Scale 1-5 assessing the extent to which respondents agree / disagree with the statements that relate to their IS department strategy *Total of 17 questions*
IS department structure	The design of organization through which the IS department is administered (based on Chandler's (1962) definition of "organizational structure")	Scale 1-5 assessing the extent to which respondents agree / disagree with the statements that relate to their IS department structure *Total of 13 questions* % of IT functions that are outsourced to external suppliers *Total of 12 questions*
IS department performance	The success in meeting the IS department's pre-defined objectives and goals	Scale 1-5 assessing the extent to which respondents indicate that the statements relating to the IS department performance never / always reflect current practices in their respective departments *19 questions*

The first section "IS Department Strategy" included 17 questions that investigate various dimensions of the IS department strategy on a 5-point likert scale ranging from "1 = Strongly Disagree" to "5 = Strongly Agree", and "0 = Not Applicable".

The Second section "IS Department Structure" included 25 questions, 13 of which assess dimensions of the internal IS department structure on a 5-point likert scale ranging from "1 = Strongly Disagree" to "5 = Strongly Agree", and "0 = Not Applicable". It also included 12 questions assessing the degree of outsourcing of various IT functions by the IS department.

The third section "IS Department Performance" included 19 questions investigating the performance of the IS department on a 5-point likert scale ranging from "1 = Strongly Disagree" to "5 = Strongly Agree", and "0 = Not Applicable".

Finally, the last section "Organizational and Respondent Profiles" included 15 questions distributed as follow: four questions investigating the structure of the respective organizations on a 5-point likert scale ranging from "1 = Strongly Disagree" to "5 = Strongly Agree", and "0 = Not Applicable"; two questions assessing (through checking) the strategy and industry of the organization; and 9 subjective questions investigating the organizational and respondent profiles.

1.3. Sample and data collection

The study population consists of a random sample (N = 2000) of CIO / IT directors in business organizations in Canada, excluding universities / colleges and federal / provincial government. The dataset and contacts of the respondents were obtained from the "Directory of Top Computer Executives in Canada". A package containing the survey, a return pre-paid envelope, and a cover letter explaining the study

and providing the link to the online version of the survey was sent to 1998 nation-wide CIOs / IT directors; two surveys were not sent due to errors in printing.

Data from the survey were collected over a period of three months (mid-March to mid-June 2010). In order to maximize the response rate, a reminder post card, with a link to the online version of the survey, was sent to all IT directors two weeks after the original mailing of the package. Appendix I presents a copy of the reminder post card.

A total number of 173 packages could not be delivered by the postal services and were returned as "wrong addresses". Overall, 154 respondents completed the paper version of the survey, and 63 respondents filled the online surveys leading to a total of 217 completed surveys with a response rate of 11.9 %.

1.4. Data analysis

As the surveys were returned, the data were cleaned and entered into Microsoft Excel (Office XP). Random verification was constantly performed to ensure reliability and accuracy in the dataset. Once the data entry was complete, the database was exported to SPSS software version 15.0 and EQS 6.1 for data analysis.

1.4.1. Descriptive analysis

Descriptive statistics were generated to provide a profile of the IS departments that responded to the survey. Frequency and mean procedures were used to determine the descriptive characteristics and distribution of the sample of surveyed IS departments in relation to questions measuring the constructs under study. Furthermore, descriptive statistics were also generated to provide an overview of the profile of the respondents as well as their respective organizations.

Raw data was checked for normality, and zero answers indicating "not applicable" were treated as system missing. With the exception of question # 54 (Your IS department fulfills service level agreements (SLAs) with different business units in the organization) where the number of "not applicable answers was 36, the maximum number of "not applicable" responses for any question was 11. In the few cases where missing values were observed, the mean score of each respective variable was substituted.

1.4.2. Factor analysis

Exploratory Factor Analysis

Exploratory factor analysis refers to the use of statistical techniques for data reduction in order to explain the maximum variance (best fit) with the smallest number of factors (Kim and Mueller, 1978; Nunally and Bernstein, 1994). It is recommended to perform this type of analysis in studies where there is no strong theory about the constructs involved (Kim and Mueller, 1978). Exploratory factor analysis is also performed in studies involving the development of instruments that had not been previously validated, in order to ensure that the specified items reflect the respective dimensions of the constructs hypothesized by the researcher (Kim and Mueller, 1978). DeCoster (1998) suggests that, when confirmatory factor analysis is performed and there is a lack of significant fit, the researcher should resort to exploratory factor analysis to identify inconsistencies between the data and the model. Then, confirmatory factor analysis can be performed again after taking out the items / variables that might not measure what the researcher thought they would.

In this research, and in light of the absence of theory and existing instruments that measure the constructs under study, exploratory factor analysis was performed in order to make sure that the respective questions included in the survey instrument measure what they were hypothesized to measure (based on previous literature and the qualitative phase). Furthermore, exploratory factor analysis was conducted to ensure that there are no cross- loadings given the fact that there is no strong theory about the constructs under study and that an initial confirmatory analysis revealed low levels of fit.

As such, Principal Component Analysis with VARIMAX (orthogonal) rotation was used for data condensation (factor analysis); this allows better grouping of variables and interpretation of the results. The SPSS program generated a list of factors with their respective eigenvalues; rotation was then performed only on factors with eigenvalues larger than 1. A cutoff point of 0.50 was used for variables loading. Variables that double loaded on more than one factor were removed, and the factor analysis re-run until no double loadings emerged.

Once the factors were identified, Chronbach alpha values for internal consistency were computed in order to assess the reliability of each factor. All factors that were considered in the final solution had alpha values greater than 0.70, except for two factors in the performance section, which had an alpha of 0.64 and 0.66, respectively. These two factors were retained in the final analysis given their moderate-high values and the exploratory nature of the project. Two researchers closely examined the items loading on each factor and identified labels that best reflect the theme represented by each factor.

Confirmatory Factor Analysis

Structural equation modeling (SEM) was used for factor analysis. EQS was adopted to perform confirmatory factor analysis of the measurement items resulting from the exploratory factor analysis. Carrying a confirmatory factor analysis of the measurement model helps in clarifying the measurement structure of the variables through providing the fit between the collected data and the theoretical factor structure. It further satisfies the requirements of uni-dimensionality, convergent validity and discriminant validity (Bagozzi, 1980 as in Teo et al., 2003 p. 30). Measures of goodness of fit were determined and minor refinements to the measurement model were made necessitating the removal of three questions measuring the IS department internal structure.

1.4.3. Cluster analysis

The main reason for performing cluster analysis is to form groups or "clusters" of cases with similar entities that differ from the entities of other clusters (Aldenderfer and Blashfield, 1984). Once exploratory and confirmatory factor analyses were performed, a score for each dimension of the constructs under study was calculated. Hierarchical cluster analysis using Ward's method was then performed on all the cases based on the calculated strategy and structure scores. Hierarchical cluster analysis forms clusters by searching for the most similar two cases in the database and grouping them together in one cluster, and Wards method aims at providing the minimum variance within clusters (Aldenderfer and Blashfield, 1984).

1.4.4. ANOVA test

One way ANOVA test was used to identify the differences in means of IS department strategy, IS department structure, and IS department performance across the uncovered clusters. It was also used to identify differences in means of the measures assessing organizational structure as well as the level of IT outsourcing between the clusters.

2. Results

2.1. Overview of the sample

Table V.3 presents an overview of the characteristics of the respondents and their respective IS departments and organizations. Overall, the largest proportion of the respondents included directors (35.5%). Around 27% were managers and 16% had an official CIO position in their respective organizations. Some held the position of vice president / president of their respective organizations (14%), which might indicate the absence of a dedicated person such a CIO or director of IS department in the respective organizations. Only a small percent of the respondents (3.2%) reported having a technical position including architects, technicians, and analysts. A few (2.8%) indicated other job titles such as coordinator, leader, and controller. The majority of the respondents (71.4%) had information technology as the area of specialization; 9.6% specialized in management / business, and the remaining small proportions of the sample in engineering (3.7%), accounting (2.3%), and math (1.8%). In general, the respondents had relatively long tenure within their respective organizations (mean = 14 years experience). The mean years of total work experience was also high reaching 26 years (range = [5 – 49] years).

The sample included respondents who work in organizations belonging to a variety of industries. Around 18% of the organizations were in services, 17% in finance and insurance, 17% in manufacturing, 9% in transportation, 8% in information, and around 5% in utilities and retail, respectively. The remaining organizations were scattered across arts and entertainment, wholesaling, agriculture and forestry, construction, and mining. Overall, the organizations varied in size with the number of employees ranging between 12 and 186,000 (mean = 4,154 employees). The mean reported total profit for last year was 300 million dollars. Finally, 44% of the organizations in the sample reported themselves as analyzers (N = 91), 38% reported themselves as defenders (N = 78), 10% as prospectors (N = 20), and only 8% reported themselves as reactors (N = 17).

The IS departments also varied in size with an average reported number of employees of 54 (range between 1 employee to 800 employees in the sample). The average number of hierarchical levels indicated by the respondents was 3 (range between 1 and 6 levels). The mean IS department budget for last year in the sample was 10 million dollars (range between 20,000 and 200 million dollars).

Table V.3 Characteristics of the respondents and their corresponding IS departments and organizations included in the sample

Profile of the respondents		
	N	*%*
Job Title		
Director	77	35.5%
Manager	58	26.7%
CIO	34	15.7%
VP / President	31	14.3%
Technical specialist	7	3.2%
Other*	6	2.8%
Area of specialization		
IT	155	71.4%
Business / Management	21	9.6%
Engineering	8	3.7%
Accounting	5	2.3%
Math	4	1.8%
Other**	13	5.9%
	Mean[Range]	
Years of experience in the organization	14 [0-45]	
Years of work experience	26 [5-49]	
Profile of the IS departments and respective organizations		
	N	*%*
Industry		
Services	40	18.4%
Finance and insurance	38	17.5%
Manufacturing	38	17.5%
Transportation	20	9.2%
Information	18	8.3%
Utilities	10	4.6%
Retail	11	5.1%
Arts and entertainment	9	4.1%
Wholesaling	8	3.7%
Agriculture and forestry	5	2.3%
Construction	4	1.8%
Mining	3	1.4%
Other	7	3.2%
	Mean[Range]	
Number of employees in the IS department	54 [1-800]	

IS department budget for last year	10m*** [20,000-200m]
Number of hierarchical levels in the IS department	3 [1-6]
Number of employees in the organization	4,154 [12-186,000]
Organization's total profit for last year	300m [-20m-10b****]
* Included controller (n = 2), coordinator (n = 1), leader (n = 2), and lead (n = 1) ** Included science (n = 3), support (n = 3), R&D (n = 2), economics (n = 1), finance (n =1) geomatics (n = 1), operations (n = 1),and service delivery (n = 1) *** m = million **** b = billion	

Figure V.1 reveals that among the IT functions presented "hardware maintenance" was the function that was outsourced by the majority of IS departments (72% of the sample reported outsourcing of this function). This is followed by application development, application maintenance and network management, which were outsourced by 67%, 56%, and 47% of the surveyed IS departments, respectively. The three IT functions including disaster recovery, data center and security systems were outsourced by around 35% of the IS departments. E-mail systems, daily operations, and help desk services were among the functions that are least outsourced in this sample (around 24% of IS departments). Finally, end-user computing was outsourced by only 18% of the IS departments.

Second, Figure V.2 presents the mean extent of outsourcing for each IT function by the IS departments in the sample that reported outsourcing of these respective functions. Although help desk services and end-user computing were the two functions that were outsourced by the smallest percent of IS departments in this sample (Figure V.1), the mean level of outsourcing was highest for these two functions. This implies that, among IS departments that reported outsourcing of help desk services and end-user computing, the mean percent of outsourcing of these two functions is 75% and 70%,

respectively. These represent the highest proportion of outsourcing of all IT functions, which are followed by e-mail systems (mean of 67% outsourced), hardware maintenance (mean of 64% outsourced), and data center (mean of 58% outsourced). Around an average of 50% of the following IT functions was reported to be outsourced to external providers: disaster recovery, network management and services, and security systems. Interestingly, although application development was the second most indicated function to be outsourced by IS departments to external providers, only an average of 50% outsourcing of this function was reported in this sample. Similarly, application maintenance was the most reported IT function to be outsourced by IS departments in the sample. Yet, it ranked the lowest in terms of the mean percent of this function that is outsourced to external providers (46%). A mean level of 47% outsourcing of daily operations was also indicated by IS departments.

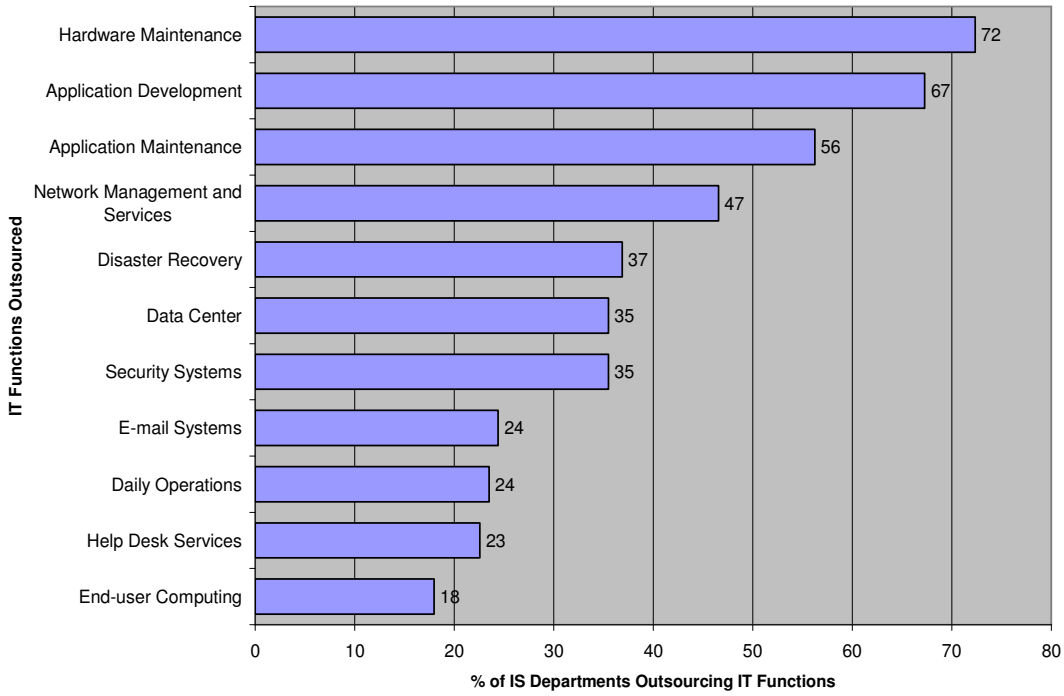


Figure V.1 Percent distribution of IS departments in the sample that reported outsourcing of various IT functions

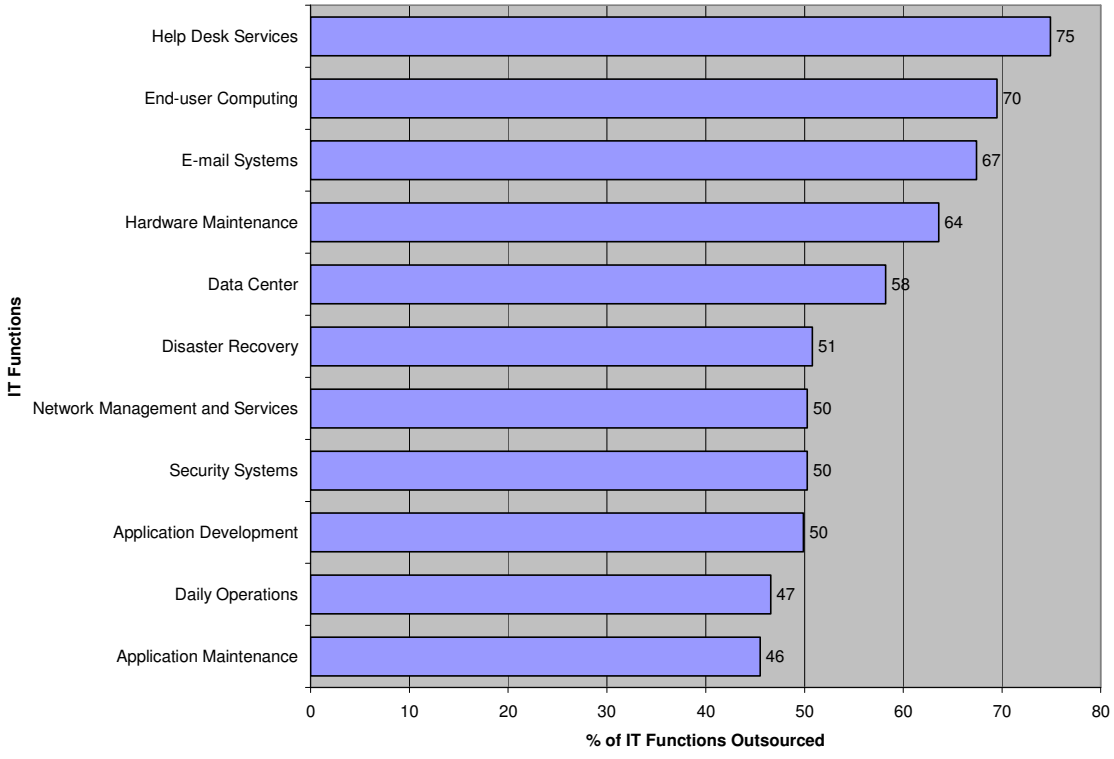


Figure V.2 Average percent of outsourcing of various IT functions among IS departments that reported outsourcing of these functions

2.2. Descriptive characteristics in relation to the main constructs

2.2.1. IS department strategy

A total of 17 questions measured the IS departments' strategy. Table V.4 presents an overview of the IS department strategy observed in the sample. Overall, the IS departments included in this study reported moderate to high scores (1-5 scale) on the questions measuring the IS department strategy, with the exception of the questions assessing the regular hiring of new skills (#8) (mean = 2.77) and the presence of a technology scanning to change IT rapidly (#12) (mean = 2.66). The low scores for these two measures reflect limited resources available for the IS departments and the need for these departments to prioritize in their expenditures.

The IS departments seem to have a high focus on improving their quality of services (#3) (mean = 4.55), improving their overall efficiency (#6) (mean = 4.51), and innovating new approaches to their operations (#7) (mean = 4.12). These scores indicate a high focus on enhancements of current operations.

Table V.4 Descriptive analysis of questions measuring IS department strategy in the sample of IS departments in Canadian business organizations

	IS department strategy measures on a 1-5 scale				
Measures (17)	*N*	*Mean*	*Median*	*Stdev*	*Range*
Strives to adopt leading edge technologies	217	3.47	4.00	0.95	1-5
Waits for technologies to mature before adopting them	217	3.96	4.00	0.88	1-5
Makes effort to improve the quality of services	217	4.55	5.00	0.65	1-5
Makes effort to increase number of services	216	3.58	4.00	0.92	1-5
Offers risk-free IT solutions	215	3.49	4.00	0.97	1-5
Works on increasing its overall efficiency	217	4.51	5.00	0.64	2-5
Works on developing innovative approaches to its operations	217	4.12	4.00	0.82	1-5
Hires new skills and talents regularly	212	2.77	3.00	1.03	1-5
Follows specific criteria when acquiring new information systems	216	3.99	4.00	0.91	1-5
Uses technologies allowing quick adaptation to environmental changes	213	3.63	4.00	0.90	1-5
Performa technology scanning to identify potential information technology	208	3.47	4.00	1.00	1-5
Has an institutionalized technology scanning approach	205	2.66	3.00	0.96	1-5
Maintains a low risk management approach	216	3.79	4.00	0.82	1-5
Has very strict security measures in place	216	4.25	4.00	0.83	1-5
Has a policy outlining the need for security and confidentiality	217	4.48	5.00	0.83	1-5
Has a complete disaster recovery plan	217	3.81	4.00	1.12	1-5
Completed the implementation of its disaster recovery plan	216	3.58	4.00	1.29	1-5

In addition, the scores on the questions assessing the security-related measures (#14, 15) were also high. IS departments reported having very strict security measures in place (mean = 4.25) and a policy in place outlining the need for security and confidentiality (mean = 4.48).

The majority of the other measures reflecting IS department strategy construct had moderate levels. The measures of risk awareness (#2,5,9,13,16,17) scored slightly higher (mean ranges between 3.49 and 3.99) than measures reflecting expanding the number of services (#4) (mean = 3.47) and looking for new technologies (#1, 11) (mean = 3.47 for both). This indicates a focus in the sample of IS departments on operating in a safe environment and staying away from instability and uncertainty. Specifically, IS departments seem to wait for technologies to mature before adopting them (mean = 3.96) and follow specific criteria when acquiring new information systems (mean = 3.99). They mostly maintain a low risk management approach (mean = 3.79) and have complete disaster recovery plan in place (mean = 3.81).

2.2.2. IS department structure

A total of 13 questions measured the IS departments' internal structure. Unlike the questions investigating IS department strategy, the measures assessing the IS department structure were associated with lower scores (1-5 scale) as indicated in Table V.5. In general, the IS departments included in the sample reported having mostly a centralized administrative structure (#18) (mean = 4.28), and keeping employees updated on current IT projects (#30) (mean = 4.17). They indicate having relatively clear and detailed job descriptions (mean = 3.91) but the internal dynamics within these departments seem to be fluid and less organized and structured.

Table V.5 Descriptive analysis of questions measuring IS department internal structure in the sample of IS departments in Canadian business organizations

	IS department structure measures on a 1-5 scale				
Measures (13)	*N*	*Mean*	*Median*	*Stdev*	*Range*
There is centralized administrative structure	215	4.28	5.00	0.93	1-5
Top IS executives make all major decisions	217	3.89	4.00	1.02	1-5
Lower level IS employees have to follow a formal procedure to communicate with top IS executives	214	2.34	2.00	1.22	1-5
Lower level IS employees communicate with top IS executives through their direct manager only	212	2.23	2.00	1.22	1-5
Communication on job related matters is predominantly vertical	214	2.66	3.00	1.13	1-5
Lines of authority are precisely defined	216	3.57	4.00	1.08	1-5
There is documentation describing departmental internal structure	217	3.88	4.00	1.09	1-5
There is documentation representing departmental rules and policies	217	3.61	4.00	1.10	1-5
IS department personnel have clear and detailed job descriptions	217	3.91	4.00	1.04	1-5
IS department personnel have to get approval from supervisors on decisions	217	3.10	3.00	0.93	1-5
IS department personnel have to follow a systematic approach when making decisions	216	3.16	3.00	0.95	1-5
IS department personnel communicate through formal channels	216	2.80	3.00	1.03	1-5
IS department personnel are kept updated on current IT projects	217	4.17	4.00	0.81	1-5

The surveyed IS departments indicated moderate scores (means ranged between 3.57 and 3.91) for measures reflecting the presence of rules and regulations (#23, 24, 25, 26). Although they report a centralized administrative structure, the lines of authority seem not to be precisely defined, and the documentation of rules, policies and internal structure is not always present. This is further highlighted by the relatively lower scores

on the measures assessing the presence of formal procedure and vertical approach for communication (mean = 2.34 and 2.66, respectively). In addition, lower level employees in the IS departments do not seem to communicate with top executives through their direct managers (mean = 2.23), which also indicates some challenges in following and abiding by a formal structure in these settings.

Last, moderate scores were reported on the measures assessing the decision making process in the IS departments (#19, 27, 28), indicating that the final decision making often takes place at the higher levels within these departments. Top executives seem to make all major decisions (mean = 3.89), and IS department personnel have to get their approval from supervisors and have to follow a systematic approach when making decisions (mean = 3.10 and 3.16, respectively).

2.2.3. IS department performance

A total of 19 questions measured the IS departments' performance, and the scores on these questions were relatively high compared to the other two constructs (Table V.6). This might be due to self-reporting bias or the tendency of respondents to overrate the performance of their respective IS departments. The highest scores were reported for the questions assessing blocking of breaching attempts (# 55) (mean = 4.49), communicating and responding to other departments' employees (# 50, 51, 58) (mean ranged between 4.17 and 4.35), and willingness of the IS department personnel to stay after-hours (# 60) (mean = 4.39). These results indicate that the IS departments included in the sample reported good performance levels in terms of security, communication, and availability.

The scores on the delivery of services (# 43, 44, 45) (means ranged between 3.99 and 4.12), the achievement of yearly goals (mean = 4.10), and the fulfillment of promises (mean = 4.15) were also high indicating high level of effectiveness.

The questions assessing the delivery of error-free services and the performance of services accurately the first time had moderate to high scores (mean = 3.74 and 3.84, respectively). This may be explained by the need to sometimes compromise the level of error-free services for a timely delivery of these services within the expected budget. IS departments may need to trade-off the error-free nature of their services to deliver services within budget and on time. Since IS departments in this sample reported "sometimes-often" delivering IS services on time, then this might explain the lower scores on the delivery of accurate and error-free services. This is further highlighted by the moderate scores on the questions assessing recurrent IT problems (mean = 3.08) and the receipt of complaints from employees of other departments (mean = 3.25).

Table V.6 Descriptive analysis of questions measuring IS department performance in the sample of IS departments in Canadian business organizations

	IS department performance measures on a 1-5 scale				
Measures (19)	*N*	*Mean*	*Median*	*Stdev*	*Range*
Delivers IS services on time	217	3.99	4.00	0.61	2-5
Delivers IS services on budget	215	4.12	4.00	0.66	2-5
Delivers IS services up to the desired quality	216	4.07	4.00	0.59	2-5
Achieves its yearly goals	214	4.10	4.00	0.69	2-5
Delivers error-free services	217	3.74	4.00	0.58	2-5
Does what it promises to do	216	4.15	4.00	0.58	2-5
Performs IS services accurately the first time	215	3.84	4.00	0.53	2-5
Informs other departments' employees about the delivery date of IS services	216	4.31	4.00	0.69	2-5
Informs other departments' employees about the delivery date of IS projects	217	4.35	4.00	0.67	2-5
Collects metrics to identify areas in its operations that need improvements	216	3.56	4.00	1.00	1-5
Receives complaints from employees of other departments	212	3.25	3.00	0.97	1-5
Fulfills service level agreements with different business units in the organization	181	3.78	4.00	1.05	1-5
Blocks breaching attempts to the security of its systems	212	4.49	5.00	0.72	2-5
IS department personnel solve all support calls that are received each day	217	3.82	4.00	0.86	1-5
IS department personnel face recurrent IT-related problems	215	3.08	3.00	0.79	1-5
IS department personnel respond to other departments' employees requests promptly	217	4.17	4.00	0.59	3-5
IS department personnel are able to solve all organizational IT-related problems	215	3.93	4.00	0.69	1-5
IS department personnel are willing to stay after-hours if needed	216	4.39	5.00	0.76	1-5
IS department personnel are too busy to respond to users' requests	215	2.33	2.00	0.80	1-5

Similarly, the IS departments' performance in relation to the fulfillment of service level agreements (SLAs) and solving all support calls that are received per day were also lower than the other questions examining different aspects of performance (mean = 3.78 and 3.82, respectively). On average, IS departments reported fulfilling SLAs and solving all support calls received per day "sometimes to often". Although these scores indicate relatively good reliability of the surveyed IS departments, they also reveal potentially limited capacity of certain IS departments to timely address all requirements and demands (range between "never to always" on these questions).

In summary, IS departments reported a relatively good level of performance despite an indication of inability to always deliver services that are error-free, on time, and addressing non-recurrent problems.

2.3. Exploratory factor analysis

Factor analysis was conducted on all the variables in each section, and only variables with loading coefficients higher than 0.5 were retained. Furthermore, variables that double loaded on two or more factors were removed, and the analysis was repeated until no double loadings were observed.

2.3.1. IS department strategy

Overall, 12 out of 17 variables originally included in the IS department strategy section were retained after conduction the exploratory factor analysis, and four factors emerged with reliability coefficients (α) higher than 0.70 (Table V.7). The five questions that were not retained in the final solution were removed due to poor loading - < 0.5 (#8 – hiring new skills and talents on a regular basis), double loading on two factors (#10 – use of technologies allowing quick adaptation to environmental changes), and low levels of

Chronbach alpha coefficient for the respective factor on which the variables were loading (#2 – waiting for technologies to mature before adopting them; #5 – offering risk-free IT solutions; #13 – maintaining low risk management approach).

Three variables loaded on the first factor that emerged in the exploratory factor analysis ($\alpha = 0.71$), including: striving to adopt leading edge technologies, performing technology scanning to identify potential information technology that can be implemented, and having an institutionalized technology scanning approach for changing IT. A close examination of these three variables reveals that they revolve around the IS departments' scanning for their resources; this factor was labeled "resource scanning".

The second factor that emerged in the exploratory factor analysis had four variables that loaded on it ($\alpha = 0.74$). These variables include: making effort to improve the quality of the services, making effort to increase the number of services, working to increase the overall efficiency, and working on developing innovative approaches to operations. As one can be observed, these variables reflect the effort exerted by the IS department in its daily operations; as such, this factor was labeled "IT effort".

Three variables loaded on the third factor that emerged in the exploratory factor analysis ($\alpha = 0.73$), which included: following specific criteria when acquiring information systems, having security measures, and having a policy for security and confidentiality. This variables reflect the guiding principles for the IS department, and as such the third factor was labeled "IT principles".

Last, two variables loaded on the fourth factor that emerged in the exploratory factor analysis ($\alpha = 0.90$), which included: having a disaster recovery plan, and

implementing a disaster recovery plan. These two variables revolve around disaster recovery, and hence the fourth factor was labeled “recovery planning”.

2.3.2. IS department structure

Overall, 11 out of 13 original variables included in the IS department structure section were retained after conducting the exploratory factor analysis (Table V.7). The two questions that were not retained were removed due to low Chronbach alpha coefficient for the respective factor on which they loaded ($\alpha < 0.70$). These variables included the presence of a centralized administrative structure (#18) and to executives making all major decisions (#19).

Two factors emerged from the exploratory factor analysis of the variables assessing the IS department structure. Three variables loaded on the first factor ($\alpha = 0.81$) and included: following formal procedures and channels for communication, getting approval from supervisors on decisions, following a systemic approach when making decisions. It is clear that these variables have the formalization theme in common. A close examination of these variables reveals that they relate to “formalization”, which was the label that was chosen for this factor.

Five variables loaded on the second factor that emerged in the exploratory factor analysis ($\alpha = 0.77$). These variables included: precise definition of the lines of authority, presence of documentation of the departmental internal structure, presence of documentation of the departmental rules and policies, clarity in job description, and updating personnel on current IT projects. As it can be noted, these variables related to the presence of documentation within the IS department; hence, the second factor was labeled “documentation”.

2.3.3. IS department performance

After performing the exploratory factor analysis on the 19 original variables included in the IS department performance sections, 16 variables were retained that loaded on four distinct factors (Table V.7). The three variables that were not retained in the final solution were removed due to double loading on two factors (#55 – blocking breaching attempts to the security of its systems), and low level of Chronbach alpha coefficient for the respective factor on which these variables were loading (#53 – receiving complaints from employees of other departments; #57 – facing recurrent IT-related problems). It is important to note that the third and the fourth factors had Chronbach alpha coefficients of 0.66 and 0.64, respectively. Although these values were lower than 0.70, they were very close to the cut off point. It is acceptable to retain factors with alpha coefficients lower but close to the cut off point, especially in exploratory studies and has been practiced in previous research (e.g. Bahli and Rivard, 2004).

The first factor was composed of seven variables ($\alpha = 0.86$) that reflect the degree to which the IS department delivers services that are on time, on budget, up to the desired quality, error-free, and accurate the first time (#43-45, 47, 49), and the extent to which the department achieves its yearly goals and does what it promises to do (#46, 48). A close examination of the variables loading on the first factor reveals that they all revolve around the reliability of the IS department; as such, this factor was labeled “reliability”.

Two variables loaded on the second factor that emerged in the exploratory factor analysis ($\alpha = 0.93$), which reflect the degree to which the IS department informs other departments’ employees about the delivery date of IS services and of IS projects. Given the nature of these variables, this factor was labeled “communication”.

Two variables loaded on the third factor that emerged in the exploratory factor analysis ($\alpha = 0.66$); these included: the degree to which the IS department collects metrics to identify the areas that need further improvement, and the degree to which the department fulfills service level agreements (SLAs) with other business units in the organization. These variables represent the performance of the IS department in terms of making sure that the quality of its services is ensured; as such, this factor was labeled "quality assurance".

Finally, the fourth factor was composed of five variables that resulted from the exploratory factor analysis ($\alpha = 0.64$). These variables included: the ability and the degree to which the IS department solves all the organizational IT-related issues, the promptness of the response to other departments' employees' requests, and the degree of busyness and willingness of the IS department's employees to stay after hours if needed. All the variables loading on this factor reflect the responsiveness of the IS department to other business units within the organization; hence, this factor was labeled "responsiveness".

Table V.7 Results of the exploratory factor analyses performed on variables in the IS department strategy, IS department structure, and IS department performance sections using 0.50 cut off point for factor loadings and 0.70 for Chronbach alpha (α) reliability measures

Exploratory factor analyses after removing double loading variables		
IS department strategy (12 variables)	IS department structure (11 variables)	IS department performance (16 variables)
1) Factor 1 (α = 0.71) – *IT resource scanning* – Strives to adopt leading edge technologies – Performs technology scanning to identify potential information technology – Has an institutionalized technology scanning approach 2) Factor 2 (α = 0.74) – *IT effort* – Makes effort to improve the quality of services – Makes effort to increase number of services – Works on increasing its overall efficiency – Works on developing innovative approaches to its operations 3) Factor 3 (α = 0.73) – *IT principles* – Follows specific criteria when acquiring new information systems – Has very strict security measures in place – Has a policy outlining the need for security and confidentiality	1) Factor 1 (α = 0.81) - *Formalization* – Lower level IS employees have to follow a formal procedure to communicate with top IS executives – Lower level IS employees communicate with top IS executives through direct manager only – Communication on job related matters is predominantly vertical – IS department personnel have to get approval from supervisors on decisions – IS department personnel have to follow a systematic approach when making decisions – IS department personnel communicate through formal channels 2) Factor 2 (α = 0.77) – *Documentation* – Lines of authority are precisely defined – There is documentation describing departmental internal structure – There is documentation representing departmental rules and policies – IS department personnel have clear and	1) Factor 1 (α = 0.86) - *Reliability* – Delivers IS services on time – Delivers IS services on budget – Delivers IS services up to the desired quality – Achieves its yearly goals – Delivers error-free services – Does what it promises to do – Performs IS services accurately the first time 2) Factor 2 (α = 0.93) – *Communication* – Informs other departments' employees about the delivery date of IS services – Informs other departments' employees about the delivery date of IS projects 3) Factor 3 (α = 0.66*) – *Quality assurance* – Collects metrics to identify areas in its operations that need improvements – Fulfills service level agreements with different business units in the organization

4) Factor 4 (α = 0.90) – *Recovery planning* – Has a complete disaster recovery plan – Completed the implementation of its disaster recovery plan	detailed job descriptions – IS department personnel are kept updated on current IT projects	4) Factor 4 (α = 0.64*) – *Responsiveness* – IS department personnel solve all support calls that are received each day – IS department personnel respond to other departments' employees requests promptly – IS department personnel are able to solve all organizational IT-related problems – IS department personnel are willing to stay after-hours if needed – IS department personnel are too busy to respond to users' requests (reversed)
* Chronbach alpha coefficients were very close to the cut-off point and considered acceptable in exploratory studies		

2.4. Confirmatory factor analysis

Once exploratory factor analysis was finalized, confirmatory factor analysis using EQS 6.1 was conducted in order to check the goodness of fit of the measurement model for each of the three constructs: IS department strategy, IS department structure, and IS department performance. Desired values for the final three measured models and their goodness of fit were adapted from Teo et al. (2003). Table V.8 presents the initial measurement model, which was suggested for each construct, along with its calculated fit indices as well as the desired fit indices as suggested by Teo et al. (2003).

Table V.8 Results of the confirmatory factor analysis and overview of the goodness of fit indices for the measurement model*

IS department strategy			
Goodness of fit	*Initial model*	*Revised model*	*Desired levels*
χ^2	95.11	_	Smaller
df	48	_	_
$\chi^{2/df}$	1.98	_	< 3.0
GFI	0.93	_	> 0.90
AGFI	0.89	_	> 0.80
Standardized RMR	0.05	_	< 0.05
RMSEA	0.06	_	0.05 – 0.08
NFI	0.9	_	> 0.90
CFI	0.94	_	> 0.90
# latent variables	4	_	_
Total # items	12	_	_
IS department structure			
Goodness of fit	*Initial model*	*Revised model***	*Desired levels*
χ^2	139.46	44.10	Smaller
df	43	19	_
$\chi^{2/df}$	3.24	2.32	< 3.0
GFI	0.88	0.95	> 0.90
AGFI	0.82	0.90	> 0.80
Standardized RMR	0.08	0.05	< 0.05
RMSEA	0.1	0.07	0.05 – 0.08
NFI	0.83	0.92	> 0.90
CFI	0.87	0.95	> 0.90
# latent variables	2	2	_
Total # items	11	8	_
IS department performance			
Goodness of fit	*Initial model*	*Revised model*	*Desired levels*
χ^2	136.57	_	Smaller
df	98	_	_
$\chi^{2/df}$	1.39	_	< 3.0

GFI	0.92	_	> 0.90
AGFI	0.90	_	> 0.80
Standardized RMR	0.04	_	< 0.05
RMSEA	0.04	_	0.05 – 0.08
NFI	0.90	_	> 0.90
CFI	0.96	_	> 0.90
# latent variables	4	_	_
Total # items	16	_	_

χ^2 = Chi square; df = degrees of freedom; GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index; RMR = Root Mean Square Residual ; RMSEA = Root Mean Square Error of Approximation; NFI = Normed Fit Index; CFI = Comparative Fit Index

* This table was adapted from Teo et al (2003)
** Revised model after deleting questions #28, 29, and 30

The fit indices of the initial model representing the IS department strategy as well as the IS department performance construct were found to be within the desired levels and hence no further adjustments were made for these two models. The final number of latent variables for the IS department strategy model as well as the IS department performance model was 4, with 12 items included in former and 16 items retained in the later.

The IS department structure initial model had lower levels than the desired ones. Therefore, subsequent adjustments were done to this model by eliminating one variable at a time and checking the fit indices until a revised model with good level of fit (fit indices within the desired levels) was obtained. Three questions were eliminated in the process of model adjustment that relate to IS personnel having a systematic approach when making daily decisions (#28), communicating through formal channels (#29), and being kept updated on current It projects in the department (#30). The revised IS department structure model had two latent variables and eight items.

Following the confirmatory factor analysis, a descriptive overview of the sample on the resulting factors (Table V.9) reveals a high focus in the IS departments on IT effort and IT principles (mean = 4.19 and 4.24, respectively). This indicates that the sample of IS departments in this study focus on improving their services and increasing their efficiency, and follow specific principles in relation to acquiring new IS and ensuring security and confidentiality. Lower scores were observed on the two other factors representing the IS department strategy, which indicates less emphasis on performing technology scanning and adoption leading edge technologies (mean = 3.20), as well as disaster recovery planning (mean = 3.69). The scores on the two factors representing the IS department structure show that the level of formalization in the sample was the lowest (mean = 2.58) as compared to the level of documentation (mean = 3.74). This indicates that the IS departments in the sample follow to a limited extent formal procedures of communication and systematic approaches for decision making, but have more presence of documentation describing their internal structure, rules and policies, and lines of authorities. Last, an examination of the scores on the four factors representing the IS department performance indicates that they are the highest among all ten factors (Table V.9). The IS departments in the sample indicated high levels of reliability, communication, and quality assurance (mean = 4.00, 4.00, and 4.33, respectively). They reported delivering good quality of services, on time and budget, informing employees about the delivery date of services and projects, and assuring quality through process monitoring. The reported level of responsiveness was lower in the sample (mean = 3.67) in terms of timely solving problems and addressing requests and support calls.

Table V.9 Descriptive analysis of the scores on each factor representing the IS department strategy, structure, and performance constructs in the overall sample of respondents

Overall sample	*Mean*	*Median*	*Stdev*	*Range*
IS department strategy				
Factor 1: IT resource scanning	3.20	3.33	0.76	1-5
Factor 2: IT effort	4.19	4.25	0.57	2-5
Factor 3: IT principles	4.24	4.33	0.69	1-5
Factor 4: Recovery planning	3.69	4.00	1.15	1-5
Overall IS department strategy score	3.87	3.92	0.52	2-5
IS department structure				
Factor 1: Formalization	2.58	2.50	0.87	1-5
Factor 2: Documentation	3.74	3.75	0.83	1-5
Overall IS department structure score	3.16	3.13	0.71	1-5
IS department performance				
Factor 1: Reliability	4.00	4.00	0.45	2-5
Factor 2: Communication	4.00	4.00	0.48	2-5
Factor 3: Quality assurance	4.33	4.00	0.66	2-5
Factor 4: Responsiveness	3.67	3.50	0.85	1-5
Overall IS department performance score	4.00	4.00	3.99	3-5

2.5. Cluster analysis

Hierarchical cluster analysis was performed in order to identify groups of IS departments with similar characteristics. A three-cluster solution was found to best identify groups of IS departments following an examination of the dendogram, whereby the hierarchical tree was “cut” at the level where there is a big “jump” in joining two clusters together (Aldenderfer and Blashfield, 1984, Lai et al., 2007). Furthermore, in order to confirm the number of clusters that best suits the data, the change in the

agglomeration coefficient was checked (Ketchen and Shook, 1996), and it was noticed that the 3-cluster solution represents the best solution.

Table V.10 presents the differences in the mean level of various IS department strategy, structure, and performance factor scores across the three clusters; significant differences ($p = 0.00$) were observed on the ten factors representing the main constructs.

Proposition 1: IS departments' strategy and structure attributes cluster together to form distinct IS department configurations.

Significant differences were observed between the three clusters on the factors representing the IS department strategy construct. Pairwise comparisons using Tamhane's test indicate that there are significant differences in all IS department strategy attributes between cluster 1 and cluster 2 on one hand, and cluster 1 and cluster 3 on the other hand. Cluster 1 has significantly higher scores on all IS department strategy factors compared to cluster 2 and cluster 3. The differences between clusters 2 and 3 are not significant with respect to IT resource scanning, IT effort, and IT principles; however, a significant difference was identified between these two clusters in relation to recovery planning, which had a higher score in cluster 3.

Furthermore, significant differences were observed between the three clusters on the factors representing the IS department structure construct. Pairwise comparisons using Tamhane's test indicate that there are significant differences in the level of formalization as well as documentation between all three clusters. Cluster 1 has the highest scores on formalization and documentation, followed by cluster 2, and then cluster 3.

Table V.10 Comparison of the mean IS department strategy, IS department structure, and IS department performance scores (1-5 scales) across the three clusters

	Cluster 1 (n=48)	Cluster 2 (n=71)	Cluster 3 (n=98)	ANOVA F*
IS department strategy				
Factor 1: IT resource scanning	3.81_a	2.95_b	3.08_b	25.2
Factor 2: IT effort	4.51_a	4.01_b	4.16_b	12.3
Factor 3: IT principles	4.60_a	4.04_b	4.20_b	10.3
Factor 4: Recovery planning	4.55_a	2.53_b	4.12_c	114.7
Overall IS department strategy score	4.36_a	3.51_b	3.89_c	60.6
IS department structure				
Factor 1: Formalization	3.31_a	2.96_b	1.94_c	92.6
Factor 2: documentation	4.35_a	3.79_b	3.41_c	25.1
Overall IS department structure score	3.83_a	3.38_b	2.68_c	85.8
IS department performance				
Factor 1: Reliability	4.18_a	3.86_b	4.01_c**	7.9
Factor 2: Communication	4.14_a	3.85_b	4.03_a***	5.8
Factor 3: Quality assurance	4.57_a	4.22_b	4.28_b	4.7
Factor 4: Responsiveness	4.21_a	3.38_b	3.61_b	16.1
Overall IS department performance score	4.22_a	3.84_b	4.00_c	14.5

The subscripts within rows indicate significant ($p<0.05$) pairwise differences between means on Tamhane's (post hoc) test

* All differences were significant at $p = 0.00$
** Differences between the means of cluster 1 and cluster 3, and cluster 2 and cluster 3, were significant at $p < 0.10$
*** Difference between the means of cluster 2 and cluster 3 was significant at $p < 0.10$

Proposition 2: IS departments with various IS department configurations will be associated with different IS department performance levels.

Significant differences were also observed between the three clusters on the factors representing the IS department performance construct. In general, cluster 1 has the

highest performance scores, followed by cluster 3, and then cluster 2. Table V.10 shows that there is a significant difference among the three clusters in relation to reliability (two of the comparisons were significant at $p < 0.10$). Furthermore, significant differences were observed on the factor representing communication between cluster 1 and cluster 2 on one hand, and cluster 2 and cluster 3 on the other hand. The pairwise comparisons between the three clusters on the factors representing quality assurance and responsiveness reveals significant differences between cluster 1 and cluster 2, as well as cluster 1 and cluster 3; in this case, no significant differences were noted between cluster 2 and 3 on these factors.

In summary, the results of the cluster analysis conducted in this research support propositions 1 and 2, and indicate that distinct IS department configurations emerged in the sample, which are associated with different IS department performance levels. Specifically, each configuration reflects the distinct profile of its respective IS departments in relation to the IS department strategy and IS department structure attributes, and is characterized by different levels of performance.

2.6. Comparison across cluster

2.6.1. Organizational strategy and structure across clusters

As can be seen in table V.11, 44% of the organizations included in the sample had an analyzer strategy, followed by 38% having a defender strategy. Prospectors and reactors represent 10% and 8% of the total sample, respectively. There was no significant difference in the distribution of the firms in the three clusters in terms of their organizational strategies.

The mean average for the degree of organizational centralization and formalization was 4.24 and 3.43 respectively; and the analysis showed a significant difference between clusters 1 on one hand, and cluster 2 and cluster 3 on the other hand, in terms of the structure of the organization. Firms in cluster 1 had significant higher levels of centralization and formalization than the other two clusters.

2.6.2. IS department and organizational characteristics across clusters

Table V.11 presents the characteristics of the IS departments as well as the organizations to which they belong. Despite some variations between the three clusters, no significant differences were observed between the three groups on the IS departments and organizations characteristics. The average number of employees in the IS departments in clusters 1 and cluster 3 was very similar (58 and 57, respectively), while the average number of IS departments employees in cluster 2 was 47. However, the average IS department budget for last year was similar between the three clusters (around 10 million dollars).

The respective organizations in cluster 1 and cluster 3 had similar average total profit for last year (around 400 million dollars), while the average total profit for last year for organizations in cluster 2 was 100 million dollars. Finally, the three clusters differed in their average number of employees. Organizations in cluster 1 reported an average of 5,700 employees, while organizations in cluster 2 and cluster 3 had an average of 2,901 and 4,305 employees, respectively.

Table V.11 Comparison of the organizational strategy and structure, and IS department characteristics, across the three clusters

	Cluster 1 (n=48)	Cluster 2 (n=71)	Cluster 3 (n=98)	Overall sample
Organizational strategy*				
	N (%)	*N (%)*	*N (%)*	*N (%)*
Defender	15 (33%)	24 (35%)	39 (43%)	78 (38%)
Prospector	7 (15%)	5 (7%)	8 (9%)	20 (10%)
Analyzer	22 (48%)	34 (49%)	35 (38%)	91 (44%)
Reactor	2 (4%)	6 (9%)	9 (10%)	17 (8%)
Organizational structure				
	Mean [Range]	*Mean [Range]*	*Mean [Range]*	*Mean [Range]*
Centralization	4.52_a [4-5]	4.15_b [2-5]	4.15_b [3-5]	4.24 [2-5]
Formalization	3.90_a [2-5]	3.45_b [1-5]	3.19_b [1-5]	3.43 [1-5]
IS department and organizational characteristics				
	Mean [Range]	*Mean [Range]*	*Mean [Range]*	*Mean [Range]*
No. employees in IS department	58 [1-600]	47 [1-800]	57 [1-530]	54 [1-800]
IS department budget for last year (m=millions)	10m [20,000-100m]	10m [65,000-200m]	10m [60,000-80m]	10m [20,000-200m]
No. employees in organization	5,700 [18-90,000]	2,901 [12-55,000]	4,305 [22-186,000]	4,153 [12-186,000]
Organization's total profit for last year (m=millions)	400m [0-2 billion]	100m [-350,000-1 billion]	400m [-20m-10 billion]	300m [-20m-10 billion]

* Organizational strategy was measured based on the typology of Miles and Snow (1978).

The subscripts within rows indicate significant ($p<0.05$) pairwise differences between the organizational structure means on Tamhane's (post hoc) test

No significant differences were found between the three clusters on organizational strategy, and IS department and organizational characteristics

2.6.3. IT outsourcing across clusters

This section provides an overview of IT outsourcing as a control variable across the three clusters. Table V.12 presents the comparison of the percent of IS departments reporting outsourcing of various IT functions across the three clusters.

In general the majority of IS departments in cluster 1 reported outsourcing of hardware maintenance (75%), application development (69%), and application maintenance (60%); whereas end-user computing, and help-desk services were outsourced by the least number of IS departments in this cluster, 17% and 21% respectively.

Similarly, most of the IS departments in cluster 2 reported outsourcing of application development (75%) and application maintenance (68%), while end-user computing and help-desk services were outsourced by 24% and 28% of the IS departments belonging to this cluster.

In parallel to what was reported in cluster 1 and cluster 2, the majority of IS departments in cluster 3 reported outsourcing of hardware maintenance (73%) and application development (61%). However, help-desk services, daily operations, e-mail system, and end-user computing were outsourced by only 19%, 18%, 16%, and 14% of the IS departments in this cluster, respectively. Although there are some differences in the percent of IS departments that outsource various IT functions in the three clusters, these differences were not significant except for application maintenance and e-mail system. A larger percent of IS departments reported outsourcing of application maintenance (68%) and e-mail systems (34%) in cluster 2, as compared to 60% and 27% in cluster 1, and 46% and 16% in cluster 3, respectively.

Table V.12 Comparison of the percent of IS departments reporting outsourcing of various IT functions across the three clusters

	Cluster 1 (n=48) *N (%)*	Cluster 2 (n=71) *N (%)*	Cluster 3 (n=98) *N (%)*	p-value*
Application development	33 (69%)	53 (75%)	60 (61%)	0.180
Application maintenance	29 (60%)	48 (68%)	45 (46%)	0.016
Data center	16 (33%)	27 (38%)	34 (35%)	0.850
Security center	14 (29%)	29 (41%)	34 (35%)	0.416
Help desk services	10 (21%)	20 (28%)	19 (19%)	0.382
Network management and services	25 (52%)	35 (49%)	41 (42%)	0.432
End-user computing	8 (17%)	17 (24%)	4 (14%)	0.262
Disaster recovery	20 (42%)	31 (44%)	29 (30%)	0.128
Hardware maintenance	36 (75%)	49 (69%)	72 (73%)	0.732
Daily operations	12 (25%)	21 (30%)	18 (18%)	0.228
E-mail system	13 (27%)	24 (34%)	16 (16%)	0.029

* Represents the significance level associated with the Chi Square test assessing the difference in the proportion of IS departments reporting outsourcing of a certain IT functions across the three clusters

Table V.13 presents the mean percent of outsourcing of various IT function across the three clusters. IS departments in cluster 1 reported outsourcing end-user computing to the highest degree (mean = 91.3%) followed by e-mail system and help desk services

(means = 76.9% and 76% respectively); application maintenance was the least outsourced (mean = 48.7%).

Table V.13 Comparison of the mean percent of outsourcing of various IT functions across the three clusters

	Cluster 1 *Mean% [Range]*	Cluster 2 *Mean% [Range]*	Cluster 3 *Mean% [Range]*	ANOVA F*
Application development	53.6 [2-100]	51.7 [10-100]	46.3 [2-100]	0.6
Application maintenance	48.7 [2-100]	48.4 [5-100]	40.3 [2-100]	0.8
Data center	61.6 [5-100]	64.3 [5-100]	51.8 [5-100]	0.9
Security center	54.6 [10-100]	48.3 [5-100]	50.3 [5-100]	0.2
Help desk services	76.0 [10-100]	68.5 [5-100]	81.1 [10-100]	0.6
Network management and services	52.3 [3-100]	50.1 [5-100]	49.2 [5-100]	0.1
End-user computing	91.3 [50-100]	70.0 [5-100]	56.6 [2-100]	2.2
Disaster recovery	55.0 [5-100]	46.8 [10-100]	52.2 [10-100]	0.4
Hardware maintenance	57.9 [10-100]	66.0 [5-100]	64.7 [10-100]	0.6
Daily operations	57.3 [2-100]	41.5 [2-100]	45.3 [5-100]	0.7
E-mail system	76.9 [10-100]	71.5 [2-100]	53.4 [10-100]	1.6
* All differences were not significant at $p < 0.05$				

IS departments in cluster 2 outsourced their e-mail system and end-user computing to the highest extent (means = 71.5% and 70.0%, respectively); daily operations were the least outsourced in this group (mean = 41.5%).

Last, IS departments in cluster 3 outsourced a large percent of help desk services (mean = 81.1%). However, application development was the least outsourced in this group (mean = 40.3%). Although there are some differences in the percent of outsourcing of various IT functions across the three clusters, non of these differences were not significant.

Table V.14 Summary of the major findings related to the propositions

Proposition	**Supported**	**Finding**
Proposition 1	Yes	IS departments' strategy and structure attributes clustered together to form three distinct IS department configurations
Proposition 2	Yes	IS departments with various IS department configurations were associated with different IS department performance levels. IS departments in cluster 1 were performing the best, followed by IS departments in cluster 3, and cluster 2 respectively.

CHAPTER VI: DISCUSSION

1. IS department strategy, structure, outsourcing, and performance

This project examined the strategy and structure in IS departments and investigated their relationship with IS department performance and outsourcing. Case studies were conducted to examine the IS department environment in real settings and unveil attributes of the major constructs under study. The results of the case studies were used to develop a survey, which was administered to a national sample of IS departments in Canadian business organizations.

The results of the survey demonstrated a strong focus of IS departments on IT effort and IT principles as reflected by their efforts to improve their services and operations, their focus on increasing efficiency, and their strict principles for ensuring security and confidentiality. In light of the economic backlash and the pressure to reduce costs, it is important for IS departments to focus on increasing their efficiencies. In addition, given the increasing exposure to the external environment through conducting business and partnerships, it is essential that IS departments minimize their vulnerabilities and ensure that security policies and measures are in place to protect their organizations. Although technology scanning is important to identify potential opportunities and solutions that may benefit an organization, it seems that the IS departments included in the sample tend to put less emphasis on this dimension as compared to IT effort and IT principles. This might be due to the increased complexity accompanying the initial implementation of new technology, as well as the added resources that are needed for such implementation. Furthermore, the availability and implementation of a disaster recovery plan also appears to be of less priority to IS departments compared to IT effort

and IT principles. As such, it seems that the majority of the IS departments in the sample focus on their daily activities rather than long-term planning and orientation. Although a disaster is not necessarily a long-term incident, the low focus of IS departments on this dimension indicates a common philosophy of "it is not going to happen to me now". It seems that contemporary IS departments are under a lot of pressure to justify their contribution and expenditure to the extent that they are pushed towards focusing on and investing in activities that have direct value, and are associated with clear and prompt returns such as the number and quality of services, efficiency, security, and confidentiality.

The overall IS department structure score in the sample was lowest (mean = 3.16) as opposed to the IS department strategy score (mean = 3.87), and the IS department performance score (mean = 4.00). Specifically, the IS departments appear to focus minimally on formalization as indicated by their scores on the variables assessing the extent to which they follow formal procedures of communication and systematic approaches for decision making. Based on the findings, it seems that IS departments have a relatively "fluid" structure, which allows them to have more flexibility in addressing the increasing demands on them and make more rapid decisions. Nevertheless, this does not come at the expense of documentation, which appears to be more existent in these settings and necessary to outline the policies, rules, and lines of authorities.

The case studies revealed no significant differences between the IS departments in terms of their outsourcing of various IT functions. As such, IT outsourcing was considered as a control variable in the quantitative phase of this research. The analysis of the survey data showed that there is no significant difference across the clusters neither in

terms of the type of IT functions that were outsourced, nor the level of outsourcing of various IT functions. The overall pattern of outsourcing by the IS departments in the sample is in line with previous research (Beaumont and Costa, 2002; Fish and Seydel, 2006). It follows the 80 / 20 rule where the functions that are outsourced by the largest number of IS departments are outsourced to the lowest degree and vice versa. The three IT functions that are outsourced by the majority of IS departments were hardware maintenance, application development, and application maintenance. The functions that are outsourced to the highest degree are help desk services, end user computing, and e-mail systems. This indicates that although contemporary IS departments do not like to get involved with the hardware and application domains and would rather focus on their own core activities, they still keep a big portion of these functions in house in light of their extreme dependence on them.

The overall IS department performance score was the highest in this sample, as compared to the strategy and structure scores. This may be inflated given the self-reporting nature of the questions assessing the performance in these settings. IS departments reported delivering good quality of services on time and budget (reliability), informing employees about the delivery date of services and projects (communication), collecting metrics on areas requiring improvements, and fulfilling SLAs (quality assurance). Responsiveness was the dimension that scored the least among all the strategy ones. IS departments in the sample clearly indicated lower scores on solving support calls and requests, and ability to respond to all IT-related problems. Although these departments reported under the IS department strategy construct making effort to increase the number of solutions (mean = 3.58) and working on increasing their

efficiency (mean = 4.51), they seem to struggle with their limited capabilities to fully support the needs of their respective organizations. This may underline some human and financial resources constraints, which is further highlighted by the variable under the IS department strategy construct that measures hiring of new skills and talents regularly (mean = 2.77).

2. Clusters' interpretation

The cluster analysis produced three different clusters that vary in relation to their IS department strategy, structure, and performance. In order to better interpret the results, the approach used by Bergeron et al (2004) was followed, and a table was constructed to represent the mean value for each factor with a category "Low" (L), "Medium/Moderate" (M), or "High" (H) (Table VI.1). This categorization relied on dividing the sample into an upper, middle, and lower third percentile. Accordingly, an average that falls in the lower 1/3 percentile is represented by L; an average that falls in the upper 1/3 percentile is represented by H; the remaining average in the middle is represented by M.

Table VI.1 Interpretation of the cluster scores on the factors representing the IS department strategy, structure, and performance

	Cluster 1 (n=48)	Cluster 2 (n=71)	Cluster 3 (n=98)	ANOVA F*
IS department strategy				
Factor 1: IT resource scanning	H_a	L_b	M_b	25.2
Factor 2: IT effort	H_a	M_b	M_b	12.3
Factor 3: IT principles	M_a	M_b	M_b	10.3
Factor 4: Recovery planning	H_a	L_b	M_c	114.7
Overall IS department strategy score	H_a	L_b	M_c	60.6
IS department structure				
Factor 1: Formalization	H_a	M_b	L_c	92.6
Factor 2: documentation	H_a	M_b	L_c	25.1
Overall IS department structure score	H_a	M_b	L_c	85.8
IS department performance				
Factor 1: Reliability	H_a	L_b	M_c^{**}	7.9
Factor 2: Communication	M_a	M_b	M_a^{***}	5.8
Factor 3: Quality assurance	M_a	M_b	M_b	4.7
Factor 4: Responsiveness	H_a	L_b	M_b	16.1
Overall IS department performance score	H_a	L_b	M_c	14.5

The subscripts within rows indicate significant ($p<0.05$) pairwise differences between means on Tamhane's (post hoc) test

H (high), M (moderate), L (low) represent the upper, middle and lower third percentiles of the total sample

* All differences were significant at $p = 0.00$
** Differences between the means of cluster 1 and cluster 3, and cluster 2 and cluster 3, were significant at $p < 0.10$
*** Difference between the means of cluster 2 and cluster 3 was significant at $p < 0.10$

2.1. Cluster 1

Cluster 1 includes the least number of IS departments (n = 48) but is considered the "elite" among the three clusters, which might explain the lowest number of

departments included in this cluster. IS departments belonging to cluster 1 were described as "elite" since they are complete in terms of focusing on both structure and strategy attributes, and they have the best performance among all IS departments. They focus on both the organization through which the IS department is administered (scored high on both IS department structure factors), as well as the goals and ways to achieve them (scored high on three out of four IS department strategy factors).

IS departments in this cluster are characterized by an overall high IS department strategy score (mean = 4.36). Specifically, they have high focus on recovery planning, IT resource scanning, and IT effort. This indicates a strong emphasis on having a complete and implemented disaster recovery plan, performing technology scanning, and improving services, operations, and efficiency. A medium score relative to the overall sample was reported on IT principles in this cluster, although higher than the two other clusters, which indicates less emphasis on following specific criteria for acquiring information systems and security policy and measures.

The overall IS department structure score in this cluster is high (mean = 3.83), which is further reflected by high levels of documentation and formalization. The IS departments' internal structure and lines of authority are clearly defined, with rules and policies in place, and formal procedures and structured approach for communication.

A close examination of IS departments in this cluster shows that they have an overall high level of performance (mean = 4.22). They scored high on two performance factors (reliability and responsiveness) and medium on two other factors (communication and quality assurance). They deliver good quality of services, up to the budget and on time, and tend to be among the best in the sample in terms of timely solving IT-related

problems and responding to the needs of employees. Although they had medium scores on communication and quality assurance, their scores on these two factors were the highest among the three clusters. In summary, cluster 1 can be described as follows:

"Elite" – Elite IS departments have high focus on IT resource scanning, IT effort, and recovery planning along with medium focus on IT principles. They have high levels of documentation and formalization. Elite IS departments have the best performance among all IS departments, as indicated by their high reliability and responsiveness, and medium level of communication and quality assurance.

2.2. Cluster 2

Cluster 2 includes 71 IS departments that are more concerned about their structure than their strategy. They tend to focus on the organization through which the departments are administered (scored medium on both IS department structure factors) rather than the strategic orientation of these departments, and have the poorest performance of all IS departments. In this sense, they are significantly different than IS departments in the previous cluster on the overall IS department strategy, structure, and performance scores.

IS departments in this cluster are characterized by an overall low IS department strategy score (mean = 3.51). Specifically, they have low focus on IT resource scanning and recovery planning, which is opposite to what is observed in the previous cluster. This underscores minimum emphasis on performing technology scanning and adopting of leading edge technologies, as well as limited disaster recovery plan and implementation. They have medium levels of IT effort, indicating more limited effort spent on improving services, operations, and overall efficiency as compared to IS departments in cluster 1. They also have a moderate emphasis on security measures and policy, as well as on

specific criteria for acquiring new IS, which is similar to what was reported in IS departments in cluster 1.

The overall IS department structure score in cluster 2 is medium (mean = 3.38), with moderate levels of documentation and formalization. This indicates that the IS departments have moderately well defined internal structure as reflected by the definition of lines of authority, and the documentation of rules and policies. Communication in these departments tends to follow to some extent formal procedures and a structured approach, although to a lesser extent than in the case of IS departments in cluster 1.

The overall performance of IS departments in cluster 2 was low (mean = 3.84). IS departments in cluster 2 did not report a high level of performance on any of the four factors representing this construct. Unlike IS departments in cluster 1 that had high reliability and responsiveness, IS departments in cluster 2 reported low levels of performance on these two dimensions. This indicates relatively poor quality of the delivered IS services, which may not be on time and within budget. It also underscores their inability to respond to the needs and requests of employees, and address the organizational IT-related problems. IS departments in cluster 2 have medium levels of communication and quality assurance, which include informing employees about the delivery date of services and projects, identifying areas for improvement in operations, and fulfilling SLAs. In summary, cluster 2 can be described as follows:

"Structure-oriented" – Structure-oriented IS departments have high focus on IT resource scanning, medium focus on IT effort and IT principles, but low focus on recovery planning. They have medium levels of documentation and formalization. Structure-oriented IS departments have the worst performance among all IS departments,

as indicated by their low reliability and responsiveness, and medium level of communication and quality assurance.

2.3. Cluster 3

Cluster 3 includes the largest number of IS departments (n = 98) that are concerned about the strategy of the departments rather than the way the departments are administered (scored low on both IS department structure factors), and have a medium level of performance between the two other clusters. They are significantly different than IS departments in the previous two clusters on the overall IS department strategy, structure, and performance scores.

IS departments in this cluster are characterized by an overall medium IS department strategy score (mean = 3.89), with medium scores reported on all IS department strategy factors. IS departments in cluster 3 seem to perform technology scanning and adopt leading edge technologies but to a lesser extent than the elite IS departments; their score was higher than the score of structure-oriented IS departments but not significantly different. They also moderately focus on IT principles that relate to following specific criteria for acquiring IS and having security measures and policy in place, as is the case with IS departments in the other two clusters. IS departments in cluster 3 have moderate emphasis on improving services, operations, and overall efficiency (IT effort), which is similar to what is observed among structure-oriented IS departments but lower than what is observed among elite IS departments. IS departments in this cluster have moderate focus on recovery planning (complete and implemented disaster recovery plan), which falls in between the levels observed in IS departments in the two other clusters.

The overall IS department structure score in cluster 3 is the lowest of all three clusters (mean = 2.68), which indicates low levels of documentation and formalization. The IS departments in this cluster don't have well defined internal structure and lines of authority, and there is limited documentation of rules and policies. Communication also tends to follow formal procedures and a structured approach to a minimal extent.

The overall performance of IS departments in cluster 3 was moderate (mean = 3.84) between the levels observed in the elite and structure-oriented clusters. IS departments in cluster 3 reported medium levels of performance on all four factors. Similarly to what was observed in the previous two clusters, they have medium levels of communication and quality assurance, which include informing employees about the delivery date of services and projects, identifying areas for improvement in operations, and fulfilling SLAs. Their levels of reliability and responsiveness were also moderate, which fall between the levels observed for the first two clusters, although responsiveness was not significantly higher than what is observed in the structure-oriented cluster. This indicates a relatively average quality of delivered IS services, on time and within budget, and average ability to respond to the needs and requests of employees, and address the organizational IT-related problems. In summary, cluster 3 can be described as follows:

"Strategy-oriented" – Strategy-oriented IS departments have high focus on IT resource scanning, and medium focus on IT effort, IT principles, and recovery planning. They have low levels of documentation and formalization. Strategy-oriented IS departments have a moderate level of performance compared to all IS departments, as indicated by their medium reliability, communication, quality assurance, and responsiveness.

2.4. Similarities and differences across clusters

As indicated in the discussion above, IS departments in the first cluster appear to be the elite in terms of focusing on their strategy on one hand, and the internal organization through which the IS department is administered on the other hand; they had high overall IS department strategy and structure scores. Their performance was the best among all IS departments in the sample. Since it has an elite status, it is expected that this cluster have the smallest number of IS departments given the difficulty in reaching high level of focus on the strategic orientation, as well as the internal organization, and have good level of performance. The high performance scores reported by IS departments in the elite group is not surprising and similar results were found in previous research. For example, Bergeron et al. (2004) found that "group 4", which was characterized by high scores for all strategy and structure variables, was performing the best among all the uncovered groups.

The structure-oriented and strategy-oriented clusters seem to be going in opposite directions, as indicated by their different focus on strategy (cluster 3), and on structure (cluster 2). Strategy-oriented IS departments have a medium overall IS strategy score and a low overall IS structure score, as opposed to low and medium levels in the structure-oriented cluster, respectively. The performance of IS departments in the former (medium level) however bypassed the performance of IS departments in the latter (low level), which indicates that an emphasis on the long term goals and the way to achieve these goals seem to be associated with better performance than a focus on the internal organization with minimal consideration to where the IS department is going. This is consistent with previous research which has shown that having a well defined

organizational strategy is linked to high levels of performance. For example, Raymond and Croteau (2006) found that "world-class SMEs", a group of SME's that is characterized by the highest strategic orientation among all the uncovered clusters, had the highest performance scores. Furthermore, Bergeron et al. (2001) found that organizations having a high strategic orientation and medium structural complexity were performing better than organizations with high structural complexity and medium strategic orientation. This is in line with the present findings showing that strategy-oriented departments are associated with better performance levels than structure-oriented ones.

Interestingly, and despite the differences between the three clusters on the ten factors representing the three main constructs, some similarities were observed in relation to one factor under IS department strategy and two factors under IS department performance. A medium score was observed for IT principles across all three clusters, which indicates that, regardless of their focus or level of performance, IS departments moderately introduce security measures and plans, and moderately follow specific criteria when acquiring new IS. In light of the need to balance the cost and effort (time, resources) associated with the introduction of strict principles for security and new IS on one hand, and the need to have easy accessibility to data and information on the other hand, IS departments appear to have reached a moderate state that does not present challenges to the daily operations. Although there is a need to protect information, it is also important that such effort does not come at the expense of making it difficult to access the needed information by the right persons on time.

With respect to the two factors representing performance, IS departments across all three clusters reported medium levels of communication and quality assurance. It is not clear why these departments tend to only moderately inform employees about the delivery dates of services and projects, but it might be explained by the uncertainty of the environment in which they operate. The inability to always predict the exact date for the delivery of services and projects may be the reason behind this finding. In addition, IS departments across all three clusters also seem to moderately collect metrics to identify areas for improvement in their operations, and fulfill SLAs. This is an area that necessitates further attention given the importance of monitoring operations and processes for quality assurance.

Table VI.2 Summary of the emerging IS department configurations along with their respective characteristics.

IS department clusters	Characteristics
Elite IS departments	Elite IS departments have high focus on IT resource scanning, IT effort, and recovery planning along with medium focus on IT principles. They have high levels of documentation and formalization. Elite IS departments have the best performance among all IS departments, as indicated by their high reliability and responsiveness, and medium level of communication and quality assurance.
Structure-oriented IS departments	Structure-oriented IS departments have high focus on IT resource scanning, medium focus on IT effort and IT principles, but low focus on recovery planning. They have medium levels of documentation and formalization. Structure-oriented IS departments have the worst performance among all IS departments, as indicated by their low reliability and responsiveness, and medium level of communication and quality assurance.
Strategy-oriented IS departments	Strategy-oriented IS departments have high focus on IT resource scanning, and medium focus on IT effort, IT principles, and recovery planning. They have low levels of documentation and formalization. Strategy-oriented IS departments have a moderate level of performance compared to all IS departments, as indicated by their medium reliability, communication, quality assurance, and responsiveness.

3. Integration of the qualitative and quantitative findings

This section integrates the results from the qualitative and quantitative phases, and presents an analysis of the case studies in order to identify the clusters to which each of the conducted case belongs.

The IS department in the mining case study focused on its strategy and scored high in relation to all IS department strategy dimensions. Specifically, this department worked on acquiring superior skills, comparing vendors, and getting quotes from vendors, which reflect high "IT resource scanning". It also continuously improved its existing operations and followed a year-to-year plan indicating high "IT effort". In addition, it used proven technologies, performed regular backups, and monitored logs representing a high focus on "IT principles". Last, it had a clear and implemented disaster recovery plan, and hence scored high on "disaster recovery".

This IS department also had high focus on its internal structure, as reflected by: the use of a set criteria for adoption of technologies; a structured approach for decision making; distinct and clear duties for various groups / teams within the department; and a high degree of formality in interaction and communication. Therefore, the IS department in the mining case study would best be described as an *elite* department, based on the characteristics of the clusters identified in the quantitative phase.

The IS department in the manufacturing case study did not focus much on its strategy and scored low in relation to the IS department strategy dimensions. Although this department looked for innovative ways through which it can use its resources and worked on improving its current operations (i.e. medium level for the "IT effort"), it did not focus on acquiring new skills or scanning (i.e. "IT resource scanning"), did not have

any form of guidelines or principles for adopting new technologies, security or confidentiality indicating (i.e. “IT principles”), and did not have a recovery plan (i.e. “disaster recovery). Last, it lacked any plan for achieving goals, which further confirms its low strategy-oriented direction.

This IS department showed medium focus on its internal structure. It had a structured approach for plan formulation, three distinct hierarchical levels, and a structured reporting approach, which indicate medium levels of formalization. In addition, personnel in this department had identified, clear duties and responsibilities reflecting a high degree of documentation. Therefore, the IS department in the manufacturing case study would best be described as a *structure-oriented* department, based on the characteristics of the clusters identified in the quantitative phase.

The IS department in the healthcare case focused moderately on its strategy and showed a medium score in relation to all IS department strategy dimensions. Specifically, despite the fact that this department had low recovery planning (i.e. “disaster recovery”), it nevertheless shared information and followed other departments in the industry reflecting a medium orientation toward “IT resource scanning”. It focused on doing things right the first time, training organizational employees, improving current operations, and increasing efficiency, which indicates strong focus on “IT effort” dimension. Last, it implemented strict rules, adopted proven technologies, and continuously monitored its firewalls, which reflect high “IT principles”.

This IS department did not focus on its internal structure. It had only two hierarchical levels and an open environment. Employees shared office space and decision-making, which reflect a low level of “formalization”. Furthermore, personnel

did not have clear responsibilities or duties, and there was no documentation or job descriptions (i.e. low level of "documentation"). Therefore, the IS department in the healthcare case study would best be described as a *strategy-oriented* department, based on the characteristics of the clusters identified in the quantitative phase.

The IS department in the airline case study had high focus on its strategy and scored high in relation to the IS department strategy dimensions. Specifically, it performed continuous technology scans and required up-to-date employee IT-knowledge representing a high level of "IT resource scanning". Furthermore, it constantly worked on increasing its efficiency and improving its current operations, and it strived for excellence (i.e. high level on "IT effort"). It waited for technologies to settle before adopting them, monitored its vendors, and enforced strict SLAs, which further indicate a high focus on "IT principles". It also had a complete disaster recover plan implemented which demonstrate its focus on "recovery planning". Last, it had a formal plan for achieving its goals, which further confirms its high strategy-oriented direction.

This IS department showed medium focus on its internal structure. It had a clear department structure with clear distribution of responsibilities indicating high level of "documentation". Furthermore, although this department had formal and informal meetings and direct communication with medium level of formality, it also had four hierarchical levels with a structured reporting approach leading to an overall medium to high score on the structure dimension. Therefore, the IS department in the airline case study would best be described as an *elite* department, based on the characteristics of the clusters identified in the quantitative phase.

The findings of the quantitative phase demonstrate that that elite IS departments perform best followed by strategy-oriented and structure-oriented IS departments, respectively. Therefore, based on the analysis presented above, it is expected that IS departments in the mining and airline cases (identified as "elite") would have the highest level of performance, followed by the IS department in the healthcare case (identified as "strategy-oriented") and the IS department in the manufacturing case (identified as "structure-oriented"), respectively. Indeed the performance of the IS departments in the four case studies were as expected and aligned with the findings in the quantitative phase, as displayed in Figure IV.1. This indicates convergence in terms of findings between the qualitative and quantitative phases of this research.

It is important to note that a comparison between the two "elite" IS departments identified in the mining and airline cases reveals slight differences. While the IS department in the mining case study shows a high level on all the strategy and structure dimensions, the IS department in the airline case study shows high level on the strategy dimensions and medium to high level on the structure dimensions. This might explain the marginal lower performance observed in the latter when compared to the performance of the IS department in the mining case study (Figure IV.1).

This further suggests that an IS department in a specific cluster might carry few attributes pertaining to other clusters. For example, a strategy-oriented IS department might have some attributes that reflect a structure-oriented one, similar to the way that a prospector organization might have some defender characteristics. Furthermore, IS departments that are in the process of changing their strategy or internal structure may have attributes that relate to different clusters. Nevertheless, it is important to note that,

ultimately, the majority of the attributes pertaining to a specific IS department would determine under which cluster it falls.

CHAPTER VII: CONCLUSION

1. Summary of the research project

The current research identifies various configurations that emerge from the mapping of IS department strategy and structure attributes. It further explores the relationship between these configurations and IS department performance. It involved case study analysis that allowed capturing the current environment of IS departments and identifying important attributes related to the constructs investigated. The results of the case study analysis were further used for the development of a survey instrument that assesses the various measures of the study constructs. Subsequently, a nation-wide survey of IS departments in Canadian business organizations was conducted to examine the relationship between IS department strategy, IS department structure, and IS department performance using cluster analysis.

Based on the analysis of four case studies and 217 questionnaires, this study revealed three clusters of IS department, namely "elite" IS departments who focus on their strategy as well as their internal structure; "strategy-oriented" IS departments who focus on their strategy more than their internal structure; and "structure-oriented" IS departments who focus on their internal structure more than their strategy. Eilte IS departments showed the highest levels of performance, followed by the strategy-oriented departments and the structure-oriented ones respectively.

2. Contributions to research

This study provides significant contributions to researchers in the IS field by overcoming some of the limitations faced in prior studies in this area and focusing on the IS department as a unit of analysis. As such, the findings of this research provide the first step toward looking into the black box displayed in Figure II.1 (page 59). By focusing on the IS department as a unit of analysis, and investigating the relationship between two constructs (strategy and structure) pertaining to that unit, this research builds on what have been extensively studied at the organizational level in terms of the relationship between strategy and structure. It contributes to the literature in this area by studying these two constructs at the IS department level, which has not previously been examined.

Furthermore, Markus and Robey (1988) argued that IS researchers have often used different perspectives to test causality and mixed levels of analysis, which led to vague and misleading results. Pollalis (2003) further highlighted that dominant research in the IS field tend to adopt a deterministic-contingency approach, and focus on causal relationships while ignoring the totality and interaction of variables that would give better insights about the organizational reality. This research addresses these issues by using an inductive approach, and applying the configurational approach and cluster analysis technique to identify clusters of IS departments based on their strategy and structure attributes. In addition, this study shows that the configurational theory provides an appropriate approach for identifying and characterizing IS departments. Specifically, it best describes the identity of the IS department in terms of its strategy and structure, two constructs that have been widely considered as reflective of a firm's identity at the organizational level.

The exploratory nature of this research does not underline any causal relationship between fit and performance, nor limit the investigation to specific assumptions of causality. It does not involve measuring the degree of fit and its effects on performance, but rather focuses on identifying the IS department strategy and structure attributes that stick together to form various configurations, as well as the performance and management practices that are associated with these emergent configurations. In addressing these objectives, it focuses on the IS department as a unit of analysis, and follows the essential steps for successful theory building, as identified by Weber (2003).

Weber (2003) discussed the need for IS researchers to focus and further engage in theory building and highlighted the following steps as essential for successful theory building: 1) "Articulate the constructs of the study"; 2) "Articulate the laws of interaction"; 3) "Articulate the lawful state space of a theory"; and 4) "Articulate the lawful event space of a theory". These steps were followed in this research. First, the constructs involved in this research (IS department strategy and structure) were studied at the departmental level, which has not been examined in the literature before. Second, existing causal laws that define the interaction between these constructs were removed to ensure a "more parsimonious account of the phenomena that are the focus of the theory" (Weber, 2003 p.146). Third, the "lawful state space of the theory", which represents the set of values that constructs can have and that will ensure applicability of the theory, were taken into consideration. In this case, interest lies in IS departments that present specific configurations, based on the underlying strategy and structure in these settings. Therefore, the theory will not be expected to hold for departments that do not present formulated IS department strategy and structure. Finally, the "lawful event space of a

theory", which highlights the states for which the theory applies, necessitates that the researcher identifies the states of the constructs for which the theory holds. As such, the theory developed by this study is clearly applicable under identified states of the configurations. In other words, it does not hold for transition states of IS departments from one identified configuration to the other.

The results of this exploratory study may be used in the future to conduct confirmatory analyses that investigate relationships involving the constructs under investigation. The focus on IS departments provides new insights about the current environment in these settings, which is an area that is currently missing in the IS literature. By describing the profiles of IS departments based on their strategy and structure, a holistic approach was used that best reflects the existing reality in these settings. In addition, the fact that this research involved a survey of key individuals in IS departments, who are most knowledgeable about the dynamics in these settings, overcome potential challenges associated with the use of secondary data. The combination of qualitative (case analysis) and quantitative approaches (survey) enriches research and ensures a high degree of reality and control (Mason, 1989), which is the case in this project. Finally, the results of the survey were used to validate the measures developed to assess the main constructs in this research, at the IS department level, which provides a major contribution in this field in light of the limited available measures in the literature in relation to these constructs.

3. Practice implications

This research presents implications to practitioners in the context of IS departments in business organizations. It provides managers with an assessment tool that measures the performance of their respective IS department. Furthermore, it provides insight for IS departments' managers regarding the existing environment in their departments in relation to strategy and structure. Specifically, it enables managers to identify the exact profile of their IS department and compare their own department performance and management practices with those of IS departments having similar profiles. They may set a target profile, based on the cluster analysis results, and identify what needs to be done to reach that profile. For example, they may aim at the highest level of performance, and as such decide to attain a profile identical to that observed with the elite cluster, in relation to IS department strategy and structure.

With respect to IS department strategy, this project shows that managers need to put a lot of effort in scanning for IT resources and adopting new technologies. Elite IS departments scored high on this factor followed by strategy-oriented ones indicating that this factor is highly related to the performance of the IS department. For example, new and advanced resources might enable the department to increase its quality and reliability of its services as well as its efficiency and its ability to respond to all organizational employees' calls in a timely manner hence enhancing its responsiveness.

Furthermore, continuous improvement in enhancing what the IS department is currently providing as well as increasing the services offered by the department was also a critical factor needing a lot of attention from IS department managers. Elite and strategy-oriented IS departments put a lot of effort on this factor which might be linked to

the reliability of their services as well as their ability to provide a larger number of suitable services.

In addition, having IT principles, following specific criteria for acquiring new technologies, and implementing strict security measures were also given a lot of attention by high performing IS departments. Specifically, with the rapid advancement of IT and all the security issues that come with it, it is critical for managers to focus on this factor in order not to be drawn by the spark of new technologies and ignore the risks associated with their implementation.

Last, having and implementing a disaster recovery plan was another factor that managers need to address due to the nature of the IT environment as well as the dependence of many organizational operations on the services provided by the IS department.

As for the IS department structure, although formalization and having strict rules that govern interactions within the IS department might in some cases limit the productivity and efficiency of operations (as was the case in structure-oriented IS departments), yet this research shows that following rules and procedures and enforcing a professional and formal environment within the IS department was also linked to higher departmental performance. Similarly, having clear and detailed documentation of the departments processes, rules, and policies was another factor that IS managers have to focus on in order to enhance the performance of their departments.

However, one major finding of this study is that although IS departments that focus on the strategy factors as well as the structure ones are linked to the highest performance levels, IS managers should not let structure factors come in the way of

strategy ones. For example, an IS department reporting low scores on the responsiveness dimension may need to reconsider its degree formalization, which might be taking a lot of effort and delaying prompt actions by the IS department personnel. This department may also allocate more resources to IT factors under the IT effort dimension such as increasing its overall efficiency and developing innovative approaches to operations. By doing so, it will be capable of improving its responsiveness and hence ameliorate its overall performance

As such, the relationship between the IS department identity and its performance is revealed through its strategic orientation and internal structure, with the strategic element being more dominant than the structure one. For that reason, and based on the findings of this research, if the IS departments were to prioritize in the absence of the possibility of equally devoting attention and effort to its strategy and structure, it should focus on the former. Specifically, it should focus on its strategy and goals as a priority over its internal structure and the "way of doing things" in order to achieve better performance. This study has shown that IS departments that know where they are going and have clear goals and orientation perform better than IS departments that rather focus on the rules, regulations, and administration aspects. A balance would definitely lead to optimal performance. Nevertheless, IS departments should seriously be careful as not to emphasize on the aspects related to the internal structure and administration at the expense of clearly identifying their goals and outlining the ways to achieve them in order to ensure a good level of performance.

Finally, as can be noticed in table V.10, this study shows that the "IT principles", "documentation", and "quality assurance" where the three factors that scored the highest

in all strategy, structure, and performance factors respectively. All these high scoring factors relate to IT governance. This finding highlights the importance of IT governance issues to IT managers and shows that these managers put IT governance issues on the top of their priorities irrespective of their degree of focus on the strategy and structure constructs.

4. Limitations

In the context of this project, it is important to recognize some of the limitations associated with this research. First, the cross-sectional nature of this study precluded an examination over time of the relationships under study, which might provide a more complete image of the dynamics and environments in IS departments. Second, despite the response rate obtained in this study, which is considered acceptable in this field, it was not possible to compare the characteristics of respondent and non-respondent IS departments. Therefore, it was not possible to assess the representativeness of the sample despite a variability observed in the characteristics of the IS departments included in the sample and their respective business organizations. Third, although the CIOs / IT directors represent key individuals in IS departments who are knowledgeable about the environment in these settings, data collection in the survey was limited to these respondents. Finally, the inability to examine objective measures representing IS departments' performance due to variation in practice between IS departments in various organizations and lack of standard reporting approaches in this area further presented challenges in this research.

5. Research avenues

This research, which focuses on IS departments, provides findings in this area that open the door for ample future studies. Future studies may perform in-depth investigation of the relationship between IS department strategy and performance, and IS department structure and performance, and examine the dynamics that affect these relationships. Furthermore, replication of the survey in other settings will increase its validity and applicability in various contexts, and provide insights on its generalizability. The relationship between the three clusters identified in this study and other constructs such as social networking may also be investigated in future research. Although three clusters have been identified in this study, which represent the various profiles of IS departments in this sample, it is worthwhile replicating this research in industry specific settings as to identify any differences in relation to the IS departments profiles and performance. Last, future studies may expand on the current research and examine other perspectives related to the performance of IS departments like examining the perception of organizational employees.

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Appendix A

Five Major IT Decisions Need to be Made (Weill, 2004)

IT Principles	High-level statements about how IT is used in the business
IT Architecture	An integrated set of technical choices to guide the organization in satisfying business needs. The architecture is a set of policies and rules for the use of IT and Plots a migration path to the way business will be done (includes data, technology, and applications)
IT Infrastructure Strategies	Strategies for the base foundation of budgeted-for IT capability (both technical and human), shared throughout the firm as reliable services and centrally coordinated (e.g., network, help desk, shared data)
Business Application Needs	Specifying the business need for purchased or internally developed IT applications
IT Investment and Prioritization	Decisions about how much and where to invest in IT including project approvals and justification techniques

IT Governance Archetypes (Weill, 2004)

Decision rights or inputs rights for a particular IT decision are held by:		CxO Level Execs	Corp. IT and/or Business Unit IT	Business Unit Leaders or Process Owners
Business Monarchy	A group of, or individual, business executives (i.e., CxO).Includes committees comprised of senior business executives (may include CIO). Excludes IT executives acting independently.	√		
IT Monarchy	Individuals or groups of IT executives.		√	
Feudal	Business unit leaders, key process owners or their delegates.			√
Federal	C level executives and at least one other business group (e.g., CxO and BU leaders) – IT executives may be an additional participant. Equivalent to a country and its states working together.	√	√	√
		√		√
IT Duopoly	IT executives and one other group (e.g., CxO or BU leaders).	√	√	
			√	√
Anarchy	Each individual user.			

Appendix B

IT functions in relation to outsourcing

	Loh & Venkatraman, 1992	Lacity & Hirschheim, 1993	Grover et al., 1994	Teng et al., 1995	Grover et al., 1996	Ang & Straub, 1998	Aubert et al., 1999	Beaumont & Costa, 2002	Fish & Seydel, 2006
Data processing	√	√							
Systems integration	√								
Systems design	√								
Telecom network	√	√	√	√	√			√	√
Application development	√	√	√	√	√			√	√
Systems development							√		√
Data centers	√							√	√
Systems planning			√	√	√	√			
End-user support			√	√	√				
Systems operation			√	√	√				
IS strategy						√		√	
Capacity management						√			
Production scheduling						√			
Human resource management						√			
Security management						√			
Network management						√			
PC management						√		√	√

Implementation and maintenance								√	
Desktop services								√	
Help desk services								√	
Asset management								√	
Application management									√
Systems maintenance									√
Application support		√							
Residual services		√							

Appendix C

Summary of pilot case study

The main purpose of this pilot case study is to detect any flows or potential improvements that can be made to the survey instrument, and demonstrate its ability to capture the data in relation to the constructs under study. The pilot case study was conducted in a medium sized rural hospital in Canada, which serves about 50,000 individuals from Quebec and Ontario, employs 470 persons, and has an annual revenue of 38 million dollars. The interview was conducted with the chief information officer (CIO) who also acts as the chief financial officer (CFO) and vice president (VP) of the hospital.

The interview provided an overview of the strategy and structure of the organization. Through continuous discussion with its partners, and implementation of up-to-date tools for attracting practitioners, the hospital aims at providing as much services as possible to the community that it serves in a feasible manner. The general structure of the hospital follows a "traditional" framework, whereby the managers of around 45 services report directly to the VP. The VP and chief of staff report directly to the chief executive officer (CEO), who in turn reports to the board of directors. In addition, the medical staff represents an external body that reports directly to the CEO and the board of directors.

The IS department in the hospital attracts around 4.5 % of the total organizational budget and follows a horizontal structure whereby six employees report directly to the CIO who directly overlooks all operations and major decisions in the department with the help of three senior managers or coordinators (infrastructure, project implementation,

and maintenance). The three groups consider themselves a unified team; continuous discussion through weekly meeting and joint decision-making directs their operations. As such, the IS department has a people oriented environment, and follows a flexible, open door policy.

By focusing on continuous planning and discussion with major stakeholders (clinical and administrative), the IS department aims at achieving its major goals that include pro-activity, integration, and having an up-to-date infrastructure. Furthermore, the department favors being an early adopter of innovations and technologies while focusing on efficiency and ensuring a risk free environment. The department mitigates the risk associated with the adoption of new technologies by incurring an additional cost prior to the adoption. This is done through conducting a pre-evaluation of the IS department's needs and the ability of the vendors to match these needs, and engaging in a contract that makes the vendor responsible for any unfavorable outcome that may arise.

As mentioned before, the main responsibilities of the IS department include project management of new developments and operational day-to-day support (including infrastructure and clinical IT). In general, the IS department evaluates its performance by benchmarking with IS departments of other hospitals.

One third of the total IS department budget goes to project management. On average 20% of project management is outsourced to external vendors with small projects being managed by the IS department while big projects being mostly outsourced. To evaluate the performance of the IS department in managing projects, the department follows a specific model that includes meeting timelines, sticking to predetermined

budget, involving users, and ensuring that the project is highly flexible and able to respond to unexpected changes.

Having an up-to-date infrastructure, which represents the second responsibility of the IS department, attracts around 40% of the department budget with 10% of the responsibility being outsourced. The department evaluates their infrastructure performance through the evaluations and recommendations that they get from outside sources (i.e. the department hires an external source to evaluate the level to which their infrastructure adheres).

Finally, 27% of the IS department budget goes to clinical IT usage with no proportion of this responsibility being outsourced. In order to evaluate how well the IS department is doing in terms of its clinical IT responsibility, the department relies on the proper performance of the clinical software, the adequacy of the information that is coming out for good decision making, various quality indicators, and credibility and validity of the information transmitted.

Appendix D

Evaluation and modifications to the case study questionnaire based on the conducted pilot case (hospital setting)

Section	Issue	Modification
I. Interviewee Information	None	None
II. General Organizational Information	a. Need to define "structure" of the organization.	a. Question II.4.: What is the general organizational structure (i.e. what is the design of organization through which the enterprise is administered)?
III. Information System (IS) Department	a. Add a question about the percentage of the IS department budget that is allocated for outsourcing.	a. Question III.4.: Out of the total IS department budget, what percentage of that budget goes to Outsourcing?
IV. IS Department Strategy	a. There is repetition in inquiring about the goals and the mission of the department. b. Need to clarify what is meant by "what are you doing as a department to ensure…". c. Define efficiency and effectiveness.	a. Deleted one question asking about the mission of the department b. Question IV.2.: How do you ensure that you will achieve your departmental goals? c. Question IV.3.: Given the standard definition of efficiency (as the relative economy with which resources are employed) and effectiveness (as the extent to which predetermined goals are achieved), which one is a priority for the department? Why?
V. IS Department Structure	a. Need to broaden the word "divisions" in the department. b. Need to remind the interviewee of the definition of the IS department "structure".	a. Question V.3.: Are there various divisions or teams within your department? If yes, how many and how do they communicate? b. Question V.7.: In summary, how would you describe the structure (i.e. the administrative organization) of your IS department?

VI. IS Department Activities and Performance	a. There is repetition in inquiring about the major responsibilities of the department. b. Tables are complex and entail a lot of repetition c. Explain what is meant by activities. And asking for five activities for each responsibility is a lot. d. Need to identify the criteria for performance evaluation of the IS department	a. Deleted one question inquiring about the responsibilities of the IS department b. Deleted the tables and incorporate outsourcing issues in question VI.1. and VI.2. (What is the percentage of outsourcing of each responsibility / activity) c. Question VI.2.: What are the major activities (i.e. specific tasks) falling under these responsibilities? What is the percentage of outsourcing of each? d. Question VI.3.: What are the criteria through which you evaluate the performance of the IS department?
Duration of interview	a. Duration: 1hr and 13 min.	a. After deleting some questions and the interview should fall within the one hour limit

Appendix E

Case Study Protocol

Overview of the project:

This project is part of a thesis research study that sheds light on the IS departments by exploring their profiles and management practices, and assessing their performance in relation to their strategy and structure. Specifically, this project aims at developing an understanding of the contemporary IS department through identifying characteristics that best reflect the departments' strategy, structure, management practices, and performance evaluation criteria. By conducting four case studies of contemporary IS departments, attributes of each of the above constructs are expected to emerge. The results of the qualitative phase will be used in the second part of the study to develop a survey instrument, which will allow to examine the relationship between emergent (based on their strategy and structure attributes) IS departments configurations, their management practices, and their performance levels.

Field procedures:

Key issues to keep in mind before and throughout the case study:

i. Get access to key organizations or interviewees

ii. Have laptop, note pad, pens, tape recorder, cell phone, identification / business card on site.

iii. While interviewing probe on any characteristic that reflects a strategic orientation, a structural framework, a major activity practiced in the IS department, or a departmental evaluation criterion.

iv. Ask for any documents that might be of relevance to the study.

v. Ask for the names (and contacts) of anyone in the firm who might be able to give more insights about any given question.

vi. At the end of the interview, ask the respondent if there is anything that he / she can add.

vii. Stay within the specified time limit.

viii. Remember to ask for a business card.

Letter of invitation:

[LOGO] [Date]

Dear Sir / Madam,

We would like to invite you to participate in a research project on the current status of the information systems (IS) departments in organizations. The purpose of this study is to develop a clear and detailed understanding of the contemporary IS department. For this purpose, we are conducting case studies of IS departments in which we focus on identifying existing characteristics that would reflect the departments' strategy, structure, management practices, and performance.

Upon your approval for participating in the case study, a researcher will contact your secretary to schedule a one-hour meeting, during which he will be asking you questions related to the strategy and structure of your department, the outsourcing of IT activities, and the evaluation process of the department performance.

In order to follow the recommendations for proper and rigorous case study data collection, we will ask your permission to have access to documentation (e.g., memorandums, minutes of meetings, progress reports) that you deem relevant to the study. This will allow triangulation of sources of evidence and the emergence of underlying converging logic.

We will be glad to send you a copy of the final report, upon your request, describing the findings of this study once the analysis is compiled. We assure you that all the information that you will provide as well as the names and details of other individuals who might be referred to during the interview will remain confidential.

Finally, we would like to send our deepest gratitude for allocating the time to be part of this study. Please do no hesitate to contact us at: h_tamim@jmsb.concordia.ca if you have any questions or concerns.

Best regards,

[Signatures]

Case Study Questions:

Relationship Between IS Department Strategy and Structure:
A Configurational Approach

Case number: _____ **Date: _____**

I. Interviewee Information

I.1. Interview with: _____

I.2. Title: _____

I.3. Years in the company: _____

I.4. Years in current position: _____

I.5. Highest degree of education: _____

I.6. Area of training or specialization: _____

II. General Organizational Information

II.1. How big is your organization?

II.1.1. number of employees: _____

II.1.2. Annual revenue: _____

II.1.3. Other: _____

II.2. Where does your organization operate?

II.2.1. Countries: _____

II.2.2. Provinces: _____

II.2.3. Other: _____

II.3. What is the strategy of your organization?

Goals: Ways to achieve these goals:

II.4. What is the general organizational structure (i.e. what is the design of organization through which the enterprise is administered)?

III. Information System (IS) Department

III.1. How many employees are there in your IS department? _____

III.2. What was the estimated IS department budget for last year? _____

III.3. What was the actual IS department budget for last year? _____

III.4. Out of the total IS department budget, what percentage of that budget goes to Outsourcing? _____

IV. IS Department Strategy

IV.1. What are the major five goals of your department?

Goal 1
Goal 2
Goal 3
Goal 4
Goal 5

IV.2. How do you ensure that you will achieve your departmental goals?

IV.3. Given the standard definition of efficiency (as the relative economy with which resources are employed) and effectiveness (as the extent to which predetermined goals are achieved), which one is a priority for the department? Why?

IV.4. What are your department's guiding principles (set of rules) for adopting new products or technologies? Promoting innovation? And risk taking?

Adopting new technologies:

Innovation:

Risk taking:

IV.5. If you have limited resources, would you use them to improve existing operations or to increase the scope of your operations?

IV.6. To summarize, how would you describe the strategy of your department?

V. IS Department Structure

V.1. Describe the chain of command in your department? Where do you stand within this chain?

V.2. How are major decisions, such as budgeting, allocation of resources, hiring and firing of employees made in your IS department.

Budgeting: Allocation of resources: Hiring and firing of employees:

V.3. Are there various divisions or teams within your department? If yes, how many and how do they communicate?

V.4. How frequently do you meet with middle and first line managers? What is usually the purpose of such meetings?

V.5. Is there a formal procedure for lower level employees (such as a technician) to meet with you or any top manager in the department?

V.6. In summary, how would you describe the structure (administrative organization) of your IS department?

VI. IS Department Activities and Performance

VI.1. What are the top three responsibilities of the IS department, respectively? Please describe each. (Coordination, maintenance, support, archiving, data storage, marketing, global reach, etc.) What is the percentage of outsourcing of each responsibility?

VI.2. What are the major activities (i.e. specific tasks) falling under these responsibilities? What is the percentage of outsourcing of each activity?

VI.3. What are the criteria through which you evaluate the performance of the IS department?

Appendix F

Justification for the questions used in the case studies (interviews)

Question	Purpose of the question	Relationship to the Model	Reference	Level (studied)	Measures
I.1 to II. 2. 3.	Obtain background information on respondents and organizations	N/A	N/A	N/A	N/A
II. 3. What is the strategy of your organization?	Identify the overall strategic orientation of the organization as perceived by CIOs	N/A	Miles & Snow (1978)	Organizational	Prospector, defender, analyzer, and reactor
			Porter (1980)	Organizational	Cost leadership, differentiation, and focus
			Brown and Magill (1994	Organizational	Low cost, differentiation, focus
II. 4. What is the general organizational structure (i.e. what is the design of organization through which the enterprise is administered)?	Identify the overall structure of the organization as perceived by CIOs	N/A	Mintzberg (1979)	Organizational	Simple, machine bureaucracy, professional bureaucracy, divisionalized form, and adhocracy
III. 1. How many employees are there in your IS department?	Identify the size of the IS department	N/A	Tavakolian (1989)	Organizational	"Large organizational size (500 employees or more)" (p. 312)
			Brown & Magill (1994)	Organizational	"Size (total employees)" (p. 397)

			Barki (2001)	Project	Application size: "number of people on team" (p. 64)
			Chan et al. (2006)	Organizational	Organizational size: "number of employees" (p. 45)
III. 2. What was the estimated IS department budget for last year?	Obtain objective measures on IS department budget; will be used to calculate the efficiency of the IS department	IS department performance	Barki et al (2001)	Project	"Cost Gap = 1 – actual $ cost of project / estimated $ cost of project" (p. 52)
			Wallace et al. (2004)	Project	"The system was completed within budget" (p. 321)
III. 3. What was the actual IS department budget for last year?	Obtain objective measures on IS department budget; will be used to calculate the efficiency of the IS department	IS department performance	Barki et al (2001)	Project	"Cost Gap = 1 – actual $ cost of project / estimated $ cost of project" (p. 52)
			Wallace et al. (2004)	Project	"The system was completed within budget" (p. 321)
IV. 1. What are the major five goals of your department?	Determine the goals of the IS department; identify attributes of the IS department strategy	IS department strategy	Chandler (1962)	Organizational	Business strategy: "The determination of the basic long-term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" (p.16).
			Miles & Snow (1978)	Organizational	Prospector, defender, analyzer, and reactor
			Porter (1980)	Organizational	Cost leadership, differentiation, and focus

IV. 2. How do you ensure that you will achieve your departmental goals?	Determine the course of action taken in the IS department to ensure goal achievement; identify attributes of the IS department strategy	IS department strategy	Chandler (1962)	Organizational	Business strategy: "The determination of the basic long-term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" (p.16).
IV. 3. Given the standard definition of efficiency (as the relative economy with which resources are employed) and effectiveness (as the extent to which predetermined goals are achieved), which one is a priority for the department? Why?	Determine which attribute (efficiency or effectiveness) better reflect the strategic orientation of the IS department	IS department strategy	Porter (1980)	Organizational	Cost leadership, differentiation, and focus
			Sabherwal & Chan (2001)	Organizational	"There is constant drive to improve operating efficiency" (p. 29)
IV. 4. What is your department's guiding principles (set of rules) for adopting new products or technologies? Promoting innovation? And risk taking?	Determine the strategic orientation of the IS department in terms of adoption of innovations and risk taking	IS department strategy	Miller & Friesen (1982)	Organizational	"How many new lines of products or services has your firm marketed in the last 5 years?" (p. 24); "There is a strong proclivity to low risk project" (p. 24)
			Sabherwal & Chan (2001)	Organizational	"In general our mode of operations is less risky than that of our competitors" (p. 29)
			Chan et al. (2006)	Organizational	"Frequency of new product or service introduction" (p. 44); "Technological

					developments and/or innovations in business operations" (p. 44)
IV. 5. If you have limited resources, would you use them to improve existing operations or to increase the scope of your operations?	Determine whether the IS department favors depth or breadth of its operations; identify the attribute (increasing scope of operations or enhancing existing operations) that better reflects the IS department strategic orientation	IS department strategy	Miles & Snow (1978)	Organizational	Prospector, defender, analyzer, and reactor
			Porter (1980)	Organizational	Cost leadership, differentiation, and focus
			Miller & Friesen (1982)	Organizational	"How many distinctly different product lines or services does your firm market" (p. 21)
IV. 6. To summarize, how would you describe the strategy of your department?	Identify the attributes that reflect the IS department strategy; allow the interviewee to elaborate on the attributes that he / she perceives as important	IS department strategy	N/A	N/A	N/A
V. 1. Describe the chain of command in your department. Where do you stand within this chain?	Identify attributes that reflect the structure of the IS department	IS department structure	Ein-Dor & Segev (1982)	Organizational	"Number of levels below chief officer" (p. 60)

V.2. How are major decisions, such as budgeting, allocation of resources, hiring and firing of employees made in your IS department?	Determine how major decisions are made in the IS department	IS department structure	Miller & Friesen (1982)	Organizational	"Which levels of management are usually responsible for making decisions of the following types: Capital budgeting, new product introduction, acquisitions of firms, pricing of major product lines, entry into major new markets, hiring and firing senior personnel" (p. 20)
			Fiedler et al (1996)	Organizational	"To what extent are the following decisions centralized at the top levels of your organization? Capital budgeting, new product service introduction, entry into new major markets, pricing of major product lines, personnel selection" (p. 22)
			Sambamurthy & Zmud (1999)	Organizational	"Describe the distribution of IT management responsibilities between divisional IS personnel and line managers in applying IT?" (p. 288)
V. 3. Are there various divisions or teams within your department? If yes, how many and how do they communicate?	Determine the IS department structure; identify the constituents of the IS department and the principles that guide the communication between them	IS department structure	Miller and Friesen (1982)	Organizational level	"To what extent is decision making at top levels in your firm characterized by participative, cross functional discussions in which different departments, functions, or divisions get together to decide the following classes of decisions…" (p. 22)

V. 4. How frequently do you meet with middle and first line managers? What is usually the purpose of such meetings?	Identify the level of interaction between various hierarchal levels within the IS department; determine the rationale and motivation behind these meetings (e.g. consult, brainstorm, command, update)	IS department structure	Miller and Friesen (1982)	Organizational level	"To what extent is decision making at top levels in your firm characterized by participative, cross functional discussions in which different departments, functions, or divisions get together to decide the following classes of decisions…" (p. 22)
V. 5. Is there a formal procedure for lower level employees (such as a technician) to meet with you or any top manager in the department?	Determine the ease of communication with senior managers; identify the hierarchy in the IS department	IS department structure	Chandler (1962)	Organizational	Organizational structure: "Design of organization through which the enterprise is administered" (Chandler, 1962 p.16).
V. 6. In summary, how would you describe the structure (administrative organization) of your IS department?	Identify the attributes that reflect the IS department structure; allow the interviewee to elaborate on the attributes that he / she perceives as important	IS department structure	N/A	N/A	N/A

VI.1. What are the top three responsibilities of the IS department, respectively? Please describe each (Coordination, maintenance, support, archiving, data storage, global reach, etc.) What is the percentage of outsourcing of each responsibility?	Identify the major responsibilities of the IS department. & Identify the degree of outsourcing of each responsibility	IS department performance & IT Outsourcing	Fish and Seydel (2006	Organizational	Nine categories of contemporary outsourcing options: "applications development, applications management, data center operations, PC acquisition, PC maintenance, systems development, systems maintenance, telecommunications/LAN, and IT project management" (p.98)
			Lacity & Hirschheim (1993)	Organizational	"Outsourcing customers consider data processing communications, application development, applications support, and residual services" (p. 98)
			Tavakolian (1989)	Organizational	Three types of IT related activities {systems development and maintenance, systems operations, and systems administration" (p. 311)
VI.2. What are the major activities (i.e. specific tasks) falling under these responsibilities? What is the percentage of outsourcing of each activity?	Identify the major activities of the IS department. & Identify the degree of outsourcing of each activity	IS department performance & IT Outsourcing	Aubert et al. (2004)	Organizational	Outsourced IT activities: "scheduling of operations, control of operations, production support services, CPU operation, operation of operating systems, operation of applications, operating system maintenance, disk space management, hardware maintenance, printer operation, printer maintenance, PC installation, PC maintenance, network maintenance, operation of telecom. software, telecommunications lines maintenance" (p. 925)
VI.3. What are the criteria through which you evaluate the performance of the IS department?	Identify the criteria followed for evaluating the performance of the IS department	IS department performance	Ravichandran and Rai (2000)	Organizational	"IS management has clear quality objectives"(411) "Quality goals and policy are understood within the department" (p.411) "Performance standards are used to monitor and control output" (p. 411)
			Heo & Han (2003)	Organizational	Performance of IS "Organizational goal achievement" (p. 255)

Appendix G

Outline for Coding Scheme

Code: STA (Attribute of IS department strategy)
- STA 01 Growth
- STA 02 Efficiency
- STA 03 Introduction of new technologies
- STA 04 Innovation
- STA 05 …….

Code STU (Attribute of IS department structure)
- STU 01 Decision making
- STU 02 Hierarchy
- STU 03 Budget allocation
- STU 04 Planning
- STU 05 ……..

Code RES (IS department responsibility)
- RES 01 Application development
- RES 02 Systems planning
- RES 03 Telecommunication networking
- RES 04 Systems operations
- RES 05 ……

Code ACT (IS department activity)
- ACT 01 Hardware maintenance
- ACT 02 Software installation
- ACT 03 Backup filing
- ACT 04 Installing upgrades
- ACT 05 ……

Code OUT (Outsourced IT activity)
- OUT 01 Security management
- OUT 02 PC maintenance
- OUT 03 Network maintenance
- OUT 04 Help desk services
- OUT 05 ……

Code PER (Performance evaluation criteria)
- PER 01 Accuracy
- PER 02 Effectiveness
- PER 03 Efficiency
- PER 04 Responsiveness
- PER 05 ……

Appendix H

Survey Cover Letter

March 8th, 2010

Object: IS Department Strategy, Structure and Performance

Dear RESPONDENT,

On behalf of my advisor, Dr. Anne-Marie Croteau, and myself, I would like to invite you to participate in a research project that investigates the relationship between various IS department profiles and their respective performance.

To participate in this project, you are kindly asked to complete the attached survey, which requires approximately 10 minutes, or its online version available at http://lms.concordia.ca/issurvey. Your coordinates have been obtained from the Directory of Top Computer Executives in Canada.

This survey is the critical part of the dissertation required for the completion of my doctoral studies. Therefore, your participation is essential for better understanding the relationships under study and contributes to the advancement of knowledge in this area.

The returned questionnaires will be stored in a secure office and only the research team will have access to them. Once all data are obtained, they will be analyzed and the results will be reported at the aggregate level only in professional conferences and published in academic journals. If you would like to receive a complimentary copy of the report summarizing the findings of this study, please send me a note using the contact information below.

I would like to reemphasize that your participation in this survey is voluntary and confidential. The completion of this questionnaire will be regarded as your consent to participate in this research study. To keep your responses confidential and anonymous, please do not identify yourself on the survey.

Thank you in advance for your very kind participation.

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This questionnaire is aimed at the **Chief Information Officer** or **Director of the Information Systems (IS) department**. Please answer all the questions. There is no good or bad answer. Indicate your first impression. This questionnaire takes about 10 minutes to complete.

Section A. IS Department Strategy

*Please circle the extent to which you agree or disagree with the following statements that relate to **your IS department**. Level 1 indicates "Strongly Disagree"; level 5 indicates "Strongly Agree"; and NA indicates "Not Applicable".*

Your IS department …

		Strongly Disagree				Strongly Agree	NA
1.	Strives to adopt leading edge technologies	1	2	3	4	5	0
2.	Waits for technologies to mature before adopting them	1	2	3	4	5	0
3.	Makes every effort to improve the quality of the services that it provides	1	2	3	4	5	0
4.	Makes every effort to increase the number of services that it provides	1	2	3	4	5	0
5.	Offers risk-free IT solutions	1	2	3	4	5	0
6.	Works on increasing its overall efficiency	1	2	3	4	5	0
7.	Works on developing innovative approaches to its operations	1	2	3	4	5	0
8.	Hires new skills and talents on a regular basis	1	2	3	4	5	0
9.	Follows specific criteria when acquiring new information systems	1	2	3	4	5	0
10.	Uses technologies that allow quick adaptation to environmental changes	1	2	3	4	5	0
11.	Performs technology scanning to identify any potential IT that can be implemented in the organization	1	2	3	4	5	0
12.	Has a technology scanning approach institutionalized in order to change rapidly its IT when necessary	1	2	3	4	5	0
13.	Maintains a low risk management approach	1	2	3	4	5	0
14.	Has very strict security measures in place to protect its IT environment	1	2	3	4	5	0

15.	Has a policy in place that outlines the need for security and confidentiality	1	2	3	4	5	0
16.	Has a complete disaster recovery plan	1	2	3	4	5	0
17.	Completed the implementation of its disaster recovery plan	1	2	3	4	5	0

Section B. IS Department Structure

*Please circle the extent to which you agree or disagree with the following statements that relate to **your IS department**. Level 1 indicates "Strongly Disagree"; level 5 indicates "Strongly Agree"; and NA indicates "Not Applicable".*

Within your IS department …

		Strongly Disagree				Strongly Agree	NA
18.	There is a centralized administrative structure	1	2	3	4	5	0
19.	Top IS executives make all major decisions	1	2	3	4	5	0
20.	Lower level IS employees have to follow a formal procedure to communicate with top IS executives	1	2	3	4	5	0
21.	Lower level IS employees communicate with top IS executives through their direct manager only	1	2	3	4	5	0
22.	Communication on job related matters is predominantly vertical	1	2	3	4	5	0
23.	Lines of authority are precisely defined	1	2	3	4	5	0
24.	There is documentation that describes the departmental internal structure	1	2	3	4	5	0
25.	There is documentation that represents the departmental rules and policies	1	2	3	4	5	0

The personnel in your IS department …

		Strongly Disagree				Strongly Agree	NA
26.	Have clear and detailed job descriptions	1	2	3	4	5	0
27.	Have to get an approval from their supervisors on decisions they make	1	2	3	4	5	0
28.	Have to follow a systematic approach when making daily decisions	1	2	3	4	5	0
29.	Communicate through formal channels	1	2	3	4	5	0
30.	Are kept updated on current IT projects in the department	1	2	3	4	5	0

For the functions listed below, please indicate the ***% of each function*** *that is outsourced to external suppliers.*

		% Outsourced
31.	Application development	
32.	Application maintenance	
33.	Data center	
34.	Security systems	
35.	Help desk services	
36.	Network management and services	

		% Outsourced
37.	End-user computing	
38.	Disaster recovery	
39.	Hardware maintenance	
40.	Daily operations	
41.	E-mail system	
42.	Other (please specify)	

Section C. IS Department Performance

*Please circle the extent to which each of the following statements best reflect practices in **your IS department**. Level 1 indicates "Never"; level 5 indicates "Always"; and NA indicates "Not Applicable".*

Your IS department …		**Never**	**Rarely**	**Some-times**	**Often**	**Always**	**NA**
43.	Delivers IS services on time	1	2	3	4	5	0
44.	Delivers IS services on budget	1	2	3	4	5	0
45.	Delivers IS services up to the desired quality	1	2	3	4	5	0
46.	Achieves its yearly goals	1	2	3	4	5	0
47.	Delivers error-free services	1	2	3	4	5	0
48.	Does what it promises to do	1	2	3	4	5	0
49.	Performs IS services accurately the first time	1	2	3	4	5	0
50.	Informs other departments' employees about the delivery date of IS services that involve them	1	2	3	4	5	0
51.	Informs other departments' employees about the delivery date of IS projects that involve them	1	2	3	4	5	0
52.	Collects metrics to identify the areas in its operations that need improvements	1	2	3	4	5	0
53.	Receives complaints from employees of other departments within the organization	1	2	3	4	5	0
54.	Fulfills service level agreements (SLAs) with different business units in the organization	1	2	3	4	5	0
55.	Blocks breaching attempts to the security of its systems	1	2	3	4	5	0

The personnel in your IS department …		**Never**	**Rarely**	**Some-times**	**Often**	**Always**	**NA**
56.	Solve all support calls that are received each day	1	2	3	4	5	0
57.	Face recurrent IT-related problems	1	2	3	4	5	0
58.	Respond to other departments employees' requests promptly	1	2	3	4	5	0
59.	Are able to solve all the organizational IT-related problems	1	2	3	4	5	0
60.	Are willing to stay after-hours if needed	1	2	3	4	5	0
61.	Are too busy to respond to users' requests	1	2	3	4	5	0

Section D. Organizational and Respondent Profiles

*Please circle the extent to which you agree or disagree with the following statements that describe **your organizational structure**. Level 1 indicates "Strongly Disagree"; level 5 indicates "Strongly Agree"; and NA indicates "Not Applicable".*

In your organization …

	Strongly Disagree				Strongly Agree	NA
62. Top executives make all major decisions	1	2	3	4	5	0
63. There is a high degree of participation in the decision making process	1	2	3	4	5	0
64. There are a lot of rules and procedures	1	2	3	4	5	0
65. Rules and procedures are strictly enforced	1	2	3	4	5	0

66. *Please check (√) <u>one</u> of the four following statements that best describes **your organizational strategy**.*

☐ Our organization locates and maintains a secure niche in a stable product or service area. It offers limited products and services. It protects its domain by providing higher quality, superior services, and lower prices than its competitors. It concentrates on doing the best job possible in a limited area

☐ Our organization operates within a broad-market domain. It values most being "first" in new product and market areas even if they are not highly profitable. It responds rapidly to early signs concerning areas of opportunity

☐ Our organization maintains a stable, limited line of products or services, while moving out quickly to carefully-selected new developments in the industry. It can be "second-in" with a more cost-efficient product or service by carefully monitoring the actions of its competitors

☐ Our organization does not have a consistent product-market orientation. It is not as aggressive in maintaining established markets, nor is it willing to take as many risks as other competitors

67. Your title is:

68. Your training or area of specialization is:

69. The number of years of experience that you have in this organization is:

70. The number of years of work experience that you have is:

71. The number of employees in your IS department is:

72. The budget of your IS department for last year was (CAN$):

73. The number of hierarchical levels in your IS department is:

74. The number of employees in your organization is:

75. Your organization's total profit for last year was (CAN$):

76. Your organization's primary industry is: (please check only one)

☐ Agriculture and Forestry ☐ Wholesaling ☐ Transportation
☐ Arts and Entertainment ☐ Construction ☐ Manufacturing
☐ Mining ☐ Finance and Insurance ☐ Utilities
☐ Retail ☐ Information ☐ Services

Thank you for your cooperation

Please return this questionnaire by using the enclosed prepaid envelope.
If you wish to obtain a copy of the results of this survey, please attach your business card.

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Appendix I

Reminder Post Card

March 22nd, 2010

Reminder

Dear RESPONDENT,

Two weeks ago I have mailed you a questionnaire on IS department strategy, structure, and performance. If you have already returned the questionnaire, please accept my sincere thanks and disregard this follow-up. Otherwise, I would like to kindly ask you to complete this questionnaire as soon as possible.

If you did not receive the questionnaire, or if it has since been misplaced, please contact me, and I will be glad to send you another package. You can also find an online version of the questionnaire at: http://lms.concordia.ca/issurvey.

Best regards,

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