

**Organizational Strategy and IS Resource:
Linkage between Miles and Snow's Strategic Typology
and Wade and Hulland's IS Resource Typology**

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Abstract

Organizational Strategy and IS Resource: Linkage between Miles and Snow's Strategic Typology and Wade and Hulland's IS Resource Typology

Lida Sun

Two major perspectives dominate the field of organizational strategic management: market driven and resource-based perspectives. They are respectively called external and internal perspectives and are perceived as complementary to cover different domains within the context of SWOT analysis. Miles and Snow's strategic typology is viewed as a significant theoretical contribution to the understanding of strategy and therefore is investigated whether it is related to Wade and Hulland's IS resource typology.

Data previously collected through questionnaires completed by top management of 223 large Canadian firms are used for testing three hypotheses. Results indicate that outside-in IS resources are deployed in organizations with prospector strategic activities, while spanning IS resources are deployed in organizations with analyzer or defender strategic activities.

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1. Introduction

Information technology (IT) and/or Information systems (IS) have been playing a significant strategic role in organizations and have been receiving more and more attention of MIS researchers in the past few decades (Henderson and Venkatraman, 1993; Porter and Millar, 1985). Aligning IT/IS with an organization's strategy has been proved to be both required and beneficial (Porter and Millar, 1985; Chan et al., 1997). There are two major perspectives dominating the field of organizational strategic management: market driven and resource-based perspectives, alternatively called as external and internal perspectives. These two perspectives are argued as competing or complementary. Regarding the SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats), they are viewed as complementary (Foss, 1996). Indeed, they cover different domains within the context of SWOT analysis.

A significant theoretical contribution to the understanding of strategy is Miles and Snow's (1978) typology, which has been used in the past to study strategic IT alignment (Sabherwal and Chan, 2001; Croteau and Bergeron, 2001).

In IS resource field, Wade and Hulland (2004) propose IS resource typology to sort a firm's IS resources into three types of processes: inside-out, outside-in, and spanning. Little research has been done to investigate the relationship between organizational strategy and IS resource, though the relationship between Miles and Snow's strategy and information technology deployment and

capabilities are examined respectively by Croteau and Bergeron (2001) and Benedetto and Song (2003).

This study is aimed to explore whether there is a link between an organization's strategy type based on Miles and Snow's typology (1978) and an organization's IS resource type as proposed by Wade and Hulland (2004). This thesis addresses the following research question: How a type of business strategy adopted by an organization is related to its IS resource profile?

2. Literature Review

The objective of this section is to review previous literature in the area of organizational strategy, IT strategy, IS resource, and strategic alignment of IT. First, we discuss two major perspectives dominating the field of strategic management: market driven and resource-based perspectives, alternatively called as external and internal perspectives. These two perspectives are also looked within the IT context. Following a review of the competitive and complementary issues of the two perspectives, the theoretical and empirical studies in strategic alignment of IT are examined. Next, we focus on Miles and Snow's (1978) strategic typology and Wade and Hulland (2004) IS resource typology. Finally, a summary of the literature review is concluded.

2.1 Organizational Strategy & Information Technology

This chapter reviews the two major perspectives dominating the field of strategic management: market driven and resource-based perspectives. The first perspective is mainly associated to the external view of an organization usually assessed with the Porter's framework of competitive strategy. The second perspective mainly reflects the internal view of the firm by focusing on its main resources as first proposed by Barney (1991). Both external and internal views are reviewed from their original field and then within the IT context. A discussion of the competitive and complementary issues of these two perspectives is finally presented.

2.1.1 Competitive Strategy Theory

The market-driven perspective originates from the traditional economic research and reflects a market power imperative. It considers industry structure as the primary cause of strategy and performance (Henderson and Mitchell, 1997).

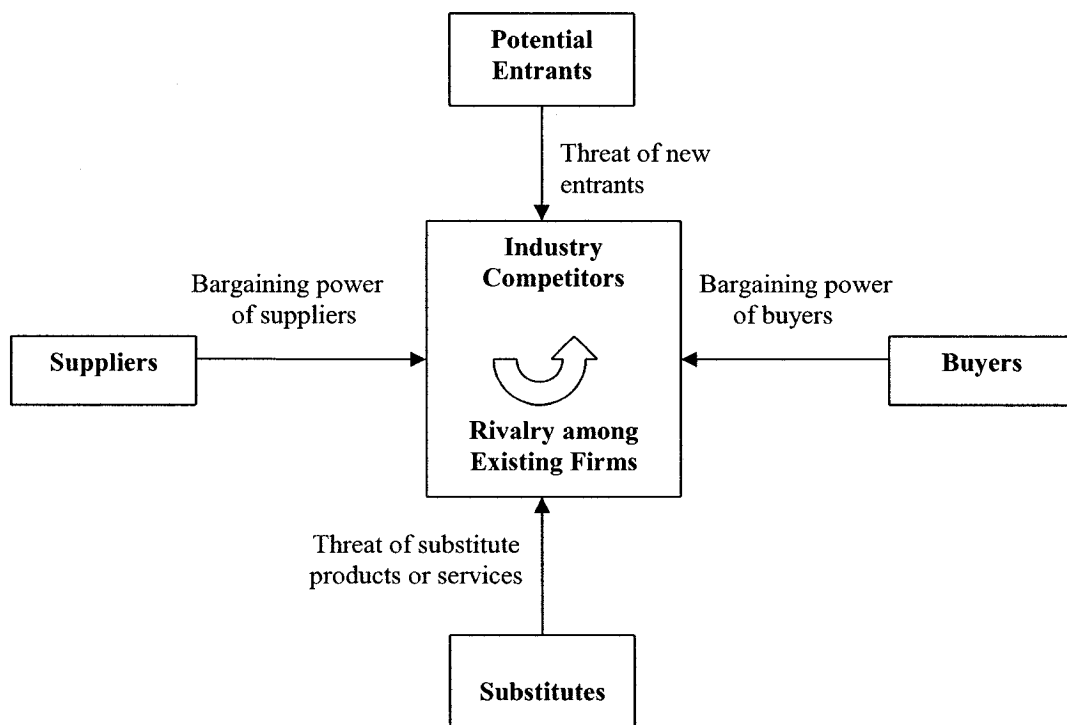
Firms are viewed as a bundle of strategic activities aiming at adapting to industry environment by seeking an attractive position in the market arena (Spanos and Lioukas, 2001). The dominant paradigm in this perspective is Porter's (1980, 1985, 1991) competitive strategy framework, which is drawn from by research adopting an "outside-in" perspective. This work has tended to focus primarily on analyzing a firm's opportunities and threats in its competitive environment and describe the environmental conditions that favour high levels of firm performance.

2.1.1.1 Porter (1980)

Porter's (1980) "five forces model" (Figure 1) describes the attributes of an attractive industry and explains the sustainability of profits against bargaining and against direct and indirect competition. The five competitive forces are threat of new entry, threat of substitution, bargaining power of buyers, bargaining power of suppliers, and rivalry among current competitors, which are defined by Porter (1980) as: (1) New entrants to an industry bring new capacity, the desire to gain market share, and often substantial resources. Reduced profitability results from bidding down prices and inflated incumbents' costs. (2) Rivalry among existing competitors manoeuvres for position by the tactics like price competition, advertising battles, product introductions, and increased customer service or warranties. (3) In a broad sense, all firms in an industry are competing with industries producing substitute products. The potential returns of an industry is therefore limited by such substitutes, which place a ceiling on the profitable prices firms in the industry can charge. The industry profits are then subject to the attractive price-performance alternative offered by substitutes. (4) Buyers compete with the industry by forcing down prices, bargaining for higher quality or more services, and playing competitors against each other, which results in the limit of industry profitability. (5) The bargaining power of suppliers over firms in an industry lies in threatening to raise prices or reduce the quality of purchased goods and services.

In the view of Porter's (1980), customers, suppliers, substitutes, and potential entrants are all competing with firms in the industry. They may be more or less prominent depending on the particular circumstances. All the five competitive forces jointly determine the intensity of industry competition and profitability. The strongest force or forces are governing and become crucial from the point of view of strategy formulation.

Figure 1. Five Forces Model of Porter (1980)



2.1.1.2 Porter (1985)

In coping with the five competitive forces, three generic strategy approaches are proposed by Porter (1985) to outperforming other firms in an industry: (1) overall

cost leadership (2) differentiation (3) focus. Sometimes the firm can successfully pursue more than one approach as its primary target, though this is rarely possible according to the author. To achieve the first approach - cost leadership, firms have to construct efficient-scale facilities aggressively, pursue cost reductions vigorously from experience, tight cost and overhead control, avoid marginal customer accounts, and minimize cost in areas such as R&D, service, sales force, advertising, and so on. A low-cost position ensures firms to gain above-average returns in their industry despite the presence of strong competitive forces. The second generic strategy is to differentiate the firm's product or service it offers and to create something that is perceived unique in the sense of industry wide. Differentiation is a successful and effective strategy to gain above-average returns in an industry. If achieved, differentiation, in a different way than cost leadership, creates a defensible position for firms to cope with the five competitive forces. Focusing on a particular buyer group, segment of the product line, or geographic market is the final generic strategy. Unlike the low cost and differentiation strategies aiming at achieving their objectives industry wide, the focus strategy is built entirely around serving a particular target very well. The firm having focus strategy is thus able to serve its narrow strategic target more effectively or efficiently than its competitors who are competing more broadly. As a result, the firm achieves either differentiation from better meeting the needs of the particular target, or lower costs in serving this target, or both (Porter 1980).

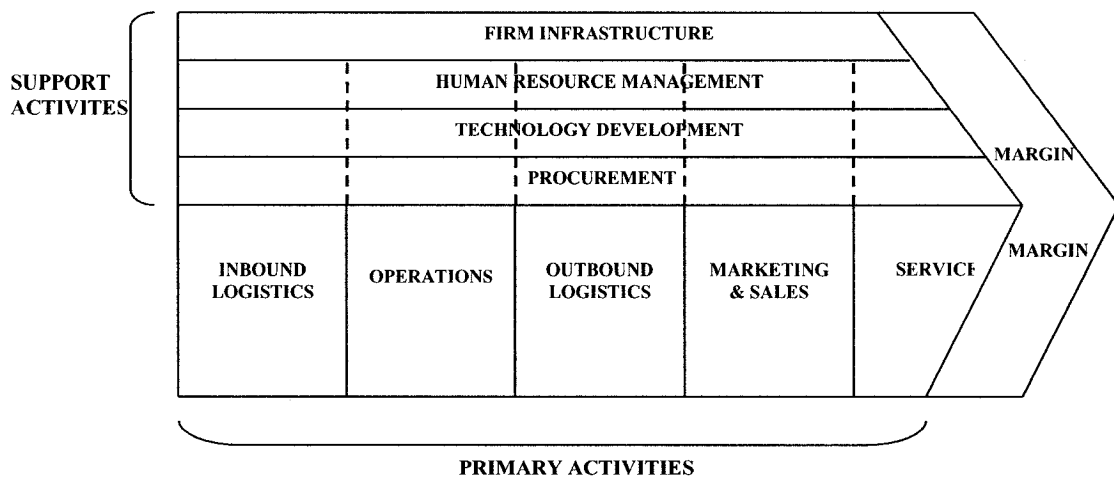
To better understand how firms gain competitive advantage, Porter introduces the value chain, shown in Figure 2, as the basic tool in his book “Competitive Advantage – Creating and Sustaining Superior Performance” (1985). The value chain divides a firm into its strategically relevant activities, such as designing, producing, marketing, delivering, and supporting its product, in order to understand the behaviour of costs and the existing and potential sources of differentiation. Each of these activities can contribute to a firm’s relative cost position and create a basis for differentiation. In order to gain competitive advantage, a firm has to perform these strategically important activities more cheaply or better than its competitors.

In competitive terms, value is defined in Porter (1985) as the amount buyers are willing to pay for what a firm provides them. A firm is perceived profitable if the value it commands is greater than the costs involved in creating the product. The goal of three generic strategies is to create value for buyers, which exceeds the cost of doing so.

Value activities are then grouped into two broad types, primary activities and support activities. Primary activities are the physical activities to create products, and to sell and transfer products to the buyer, and after-sale assistance as well. Support activities support the primary activities by providing purchased inputs, technology, human resources, and various firm-wide functions. Value activities are therefore the discrete building blocks of competitive advantage. How each

activity is performed combined with its economics determines whether a firm is high or low cost relative to competitors as well as a firm's contribution to buyer needs and hence differentiation. Differences that determine competitive advantage is explicated by comparing the value chains of competitors.

Figure 2. The Generic Value Chain by Porter (1985)



2.1.1.3 Porter (1991)

In Porter's (1991), a dynamic theory of strategy is developed from a review of the progress of the strategy field. The author separates the theory of strategy into the causes of superior performance at a given period in time and the dynamic process by which competitive positions are created, termed respectively as the cross-sectional problem and the longitudinal problem. Three streams of research are explored: game theoretic models, models of commitment under uncertainty,

and the resource-based view of the firm, all of which address the longitudinal problem.

To explain the competitive success of firms, a chain of causality is suggested to link environmental circumstances (its industry and positioning) and firm behaviour (configuration of activities) to market outcomes. Porter (1991) posits that the firm's proper choice is determined by its existing position, which is able to be systematically evaluated through its value chain and drivers, and the best strategy of the firm also relies on its competitors' capabilities and likely behaviour, which can also be evaluated through their value chains and drivers. Strategy eventually conditions on a fully understanding of industry structure.

In Porter's (1991) view, the true origin of competitive advantage may be the proximate or local environment in which a firm is based. The environment defines how to configure activities, how to assemble resources uniquely, and how to make commitments successfully. Four broad attributes of the proximate environment of a firm are identified by Porter (1991) as: (1) factor conditions, (2) demand conditions, (3) related and supporting industries, and (4) firm strategy, structure, and rivalry. These aspects of the local environment constitute a dynamic system. Finally, Porter (1991) posits that the environment, via the four broad attributes, affects both a firm's initial conditions and its managerial choices, and thus plays an important role to create potential for competitive success of a firm.

2.1.1.4 Summary of Porter (1980, 1985, 1991)

Porter's (1980, 1985, 1991) framework of competitive strategy views that the industry structure determines the competitive rules, and influences the strategies that are potentially available to the firm (Teece et al., 1997). In the view of Porter's competitive strategy, resources are not valuable in and of themselves. The significance of resources, perceived by Porter, relies on how they fit industry structure and how they support the firm's strategy (Spanos and Lioukas, 2001).

2.1.2 Competitive Strategy in IT Context

A number of IT researchers have adopted a market driven perspective to examine the potential and actual effects of IT on firm performance. Porter and Miller (1985) show how and why IT can alter the nature of competition by changing the industry structure, creating new ways to gain competitive advantage, and providing opportunities to spawn new business. Levy et al. (1999) evaluates the usefulness of information systems strategies (ISS) frameworks in the environment of small and medium-sized enterprises (SMEs) to demonstrate the applicability of Porter's value chain and five forces framework in analysing business processes and competitive drivers in such context. Tallon et al. (2000) identify four types of corporate goals for IT to evaluate the distinction of firms focusing on two key objectives, operational effectiveness and strategic positioning.

2.1.2.1 Porter and Miller (1985)

To help general managers respond to the challenges of the information revolution, this article answers such questions as: what is the impact of advances in IT on competition and competitive advantage sources? How does a firm to formulate strategies to exploit the information technology?

A useful framework is developed by the authors to analyze the strategic impact of the new IT and to demonstrate how and why the technology is changing companies' internal operation and external relationships with their suppliers, customers, and competitors. Three specific ways are identified in this paper to describe how the new technology changes the nature of competition. The three ways are as following: (1) IT alters industry structures, (2) IT supports cost and differentiation strategies, and (3) IT spawns entirely new businesses.

Five steps are then proposed in this study to help managers evaluate how the information revolution affect their own companies: (1) assess information intensity, (2) determine the role of IT in industry structure, (3) identify and rank the ways in which IT might create competitive advantage, (4) investigate how IT might spawn new businesses, and (5) develop a plan for taking advantage of IT.

2.1.2.2 Levy et al. (1999)

The authors attempt to answer two essential questions in this study: (1) what is the general need to validate information systems strategies (ISS) frameworks? and (2) how can the applicability of the frameworks be assessed in context other than their original domain? To tackle the above two problems, the authors evaluate the usefulness of ISS frameworks, which is generally believed to be of considerable benefit when planning information systems, in the context of small and medium-sized enterprises (SMEs). Earl's (1989) 'Framework of Frameworks' is utilized in this paper as the approach to evaluating the applicability of the ISS frameworks in SMEs. According to Earl (1989), individual frameworks may be classified into one of the following three frameworks: awareness, opportunity and positioning.

Exploratory case studies are conducted in four SMEs of UK manufacturing industry which have recently made large investments in IT. The Framework of Frameworks is utilized to develop interview questions assessing the applicability of each of the models in the framework to ISS planning and practice. The senior management teams in the four SMEs are interviewed by organizing a series of meetings. The article finally demonstrates that many of the frameworks, including Porter's value chain and five forces framework, are found to be of value in identifying strategic opportunities for the use of IS in SMEs, though some assumptions upon which ISS development models are based may have limited applicability outside their original domain.

2.1.2.3 Tallon et al. (2000)

To respond the call for a more inclusive and comprehensive method to measure IT business value, the authors introduce a process-oriented model to evaluate how IT impacts firm's strategic activities within the framework of the value chain. IT business value is defined by Tallon et al. (2000) as the contribution of IT to firm performance. The model is developed to explore the impact of IT on critical business activities within the corporation's value system. These activities, including production, logistics, sales and marketing, customer service, and administrative support, are incorporated in the value chain model proposed by Porter (1985). The conceptual model of IT business value demonstrates the links between corporate goals for IT, management practices, and realized IT payoffs.

A survey of 304 business executives worldwide is conducted and data are then analyzed. The result shows that there are four types of corporate goals for IT: unfocused, operations focus, market focus, and dual focus. Firms embracing "unfocused" approach have no clear goals for IT or are indifferent toward IT. "Operations-focus" firms have clearly defined goals for IT centered on operational effectiveness. "Market-focus" firms use IT to enhance their strategic positioning. Finally, firms, labelled "dual-focus", extend their use of IT beyond operational effectiveness to include market reach and new market creation.

The result of the data analysis also supports executives' perception of greater IT payoffs in the value chain in firms with more focused goals for IT, therefore confirms that these corporate goals for IT are useful indicators of IT payoffs across the value chain. It is also found that management practices, such as strategic alignment and IT investment evaluation, play an important role in creating higher IT business value.

2.1.3 Resource-Based View Theory

While a firm is viewed as a bundle of activities in Porter's competitive strategy framework, in the perspective of resource-based scholars (Barney, 1991 and Conner, 1991) a firm is viewed as a bundle of unique resources – assets, processes, and knowledge. In sharp contrast to Porter's contention, the resource-based view theory contends that the firm's unique resources are valuable in and of themselves, and should steer the choice of strategy.

2.1.3.1 Barney (1991)

This article investigates the relationship between firm resources and sustained competitive advantage in order to understand sources of sustained competitive advantage, an important research stream in strategic management. In sharp contrast to the two assumptions in the competitive strategy theory, the resource-based view theory is built on two alternative assumptions in analyzing sources of competitive advantage: First, firms within an industry (or group) have

heterogeneous strategic resources; Second, these resources may not be perfectly mobile across firms, and thus heterogeneity can be stable over time.

Rooted in evolutionary economics theory and the work of Penrose (1958), the resource-based approach emphasizes the significance of individual firm instead of the industry, as the critical analysis unit, by focusing on the relationships between firm internal characteristics and performance.

In sharp contrast to Porter's proposition that strategy is viewed as being primarily industry driven, resources, defining the essence of strategy, are valuable in and of themselves. Firm resources, defined by Barney in this article, include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm. These resources enable the firm to formulate and implement strategies in order to improve the firm's efficiency and effectiveness.

Barney (1991) classify these numerous possible firm resources into three categories: physical capital resources (Williamson, 1975), human capital resources (Becker, 1964), and organizational capital resources (Tomer, 1987). Physical capital resources consist of the physical technology utilized in a firm, a firm's plant and equipment, its geographic location, and its access to raw materials. Human capital resources refer to the training, experience, judgment, intelligence, relationships, and insight of individual managers and workers in a

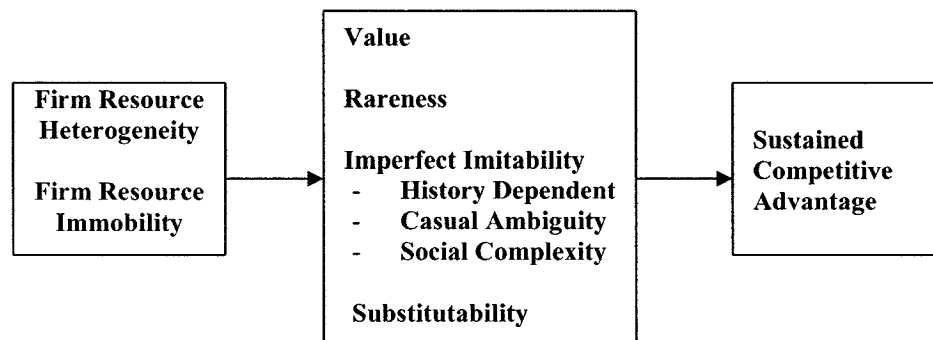
firm. Organizational capital resources are comprised of a firm's formal reporting structure, its formal and informal planning, controlling, and coordinating systems, and informal relations among groups within a firm and between a firm and those in its environment.

In this article, a firm is perceived to gain a sustained competitive advantage when it is implementing a value creating strategy, which is not simultaneously being implemented by any current or potential rivals, and is impossible for these other firms to duplicate the benefits of this strategy. Four empirical attributes of firm resources to generate sustained competitive advantage are discussed as following: value, rareness, imitability, and substitutability. The author states that firm resources must be valuable for the firm to utilize opportunities and /or counteract threats in the firm's environment. A firm resource must also be rare among a firm's current and potential competition, as well as be impossible for a firm's current and potential rivals to imitate. Finally, even though the resource is not rare or imperfectly imitable, there are no strategically equivalent substitutes for this valuable resource.

A framework (shown in Figure 3) is developed to reflect the relationship between resource heterogeneity and immobility; value, rareness, imitability, and substitutability; and sustained competitive advantage. This framework is applied to analyze the potential of different firm resources as the sources of sustained competitive advantage. Finally it also suggests a few empirical questions for

practitioners as follows in order to better understand whether a particular firm resource is a source of sustained competitive advantage or not: Is that resource valuable? Is it rare? Is it imperfectly imitable? Are there substitutes for that resource? In addition of addressing the above questions, this firm resource model of sustained competitive advantage has a variety of research implications for the relationship between strategic management theory and other business disciplines.

Figure 3. The Firm Resource Model of Sustained Competitive Advantage by Barney (1991)



2.1.3.2 Conner (1991)

The purpose of this article is to assess the distinctiveness of strategy's resource-based theory, as compared to other major streams of antecedent theory related to industrial organization (IO) economics. The author explores the degree to which a resource-based theory is fundamentally distinct from other major

theories used in IO economics, which leads to the final conclusion that resource-based view is a new theory of the firm.

First, an appropriate comparison with the other major theories of the firm is conducted within that tradition to identify the distinctiveness of the resource-based approach in comparison to IO. Five significant IO theories are summarized and then analyzed. These five theories include neoclassical theory's perfect competition model, Bain-type IO, the Schumpeterian and Chicago responses, and transaction cost theory. The author then analyzes the similarities of resource-based approach to these five IO-related theories and the differences of resource-based view from these five theories as well. The author then come to the conclusion that the resource-based perspective combines at least one major component from each of the five theories and at the same time excludes at least one important element from each of five theories as well. Therefore, resource-based theory has a strong heritage from IO, while presents fundamental differences from any one of these five theories simultaneously to entail a new way of viewing the firm that is different from any one of these IO-related theories. Thus the author's contention is confirmed that a resource-based view in strategic management emphasizes costly-to-copy attributes of the firm being sources of economic rents and, therefore, fundamentally leading to performance and competitive advantage.

2.1.4 Resource-Based View Theory in IT Context

The resource-based view (RBV) is increasingly being used in the information system field (Bharadwaj, 2000; Mata et al., 1995; Ross et al., 1996). The RBV theory is argued indeed useful to IS research. It is believed to provide a valuable approach for IS researchers to thinking about how information systems relate to firm strategy and performance and as well as to provide a cogent framework to evaluate the strategic value of information systems resources (Wade and Hulland, 2004).

2.1.4.1 Bharadwaj (2000)

The author explores the concept of IT as an organizational capability and empirically investigates the relationship between IT capability and firm performance by focusing on the performance effects of IT and employing the resource-based theory to explore and empirically examine the theoretical links between IT capability and business performance.

A firm's IT capability is defined in this study as the ability to mobilize and deploy IT-based resources in combination or co-present with other resources and capabilities. The key IT-based resources are then classified into one of the three followings: (1) the tangible resources comprising the physical IT infrastructure components, (2) the human IT resources comprising the technical and managerial IT skills, and (3) the intangible IT-enabled resources including knowledge assets, customer orientation, and synergy, etc.

Both a matched sample comparison group methodology and publicly available ratings are employed to empirically evaluate the association between superior IT capability and firm performance. In this case, a sample of firms with high IT capability and a carefully selected control sample of firms match to the treatment sample by size and type. Research result shows that firms with higher IT capability tend to achieve better performance than a control sample of firms in terms of a variety of profit measures and cost-base performance measures.

2.1.4.2 Mata et al. (1995)

Addressing some recent theory developments in the area of strategic management, this paper is aimed to develop and apply a model that identifies the conditions under which IT can, and can not, be the source of sustained competitive advantage. The authors first describe the resource-based view as an approach to analyzing sustainability and then propose a model based on this resource-based theory of firm.

Five specific attributes of IT are indicated from the review of the IT literature as possible sources of sustained competitive advantage for firms. Four of the five attributes of IT are then applied in the research model – access to capital, proprietary technology, technical IT skills and managerial IT skills - which are perceived to be potential sources of sustained competitive advantage.

Based on the resource-based analysis, the researchers reach the conclusion that among these four attributes, only managerial IT skills are the potential source of sustained competitive advantage. This analysis also indicates that the resource-based view of the firm suggests less focus on IT, per se, and more on the process of organizing and managing IT within a firm in its search for IT-based sources of sustained competitive advantage.

2.1.4.3 Ross et al. (1996)

In this article, the authors attempt to answer the question how firms can apply IT to enhance competitiveness. In searching the answer to this question, the researchers identify and analyze the development of an effective IT capability, the ability of IT-related cost control, system delivery, and business objective achievement through IT implementations. This IT capability originates from careful management of three key IT assets: (1) a highly competent IT human resource, (2) a reusable technology base, and (3) a strong partnering relationship between IT and business management.

In this paper, the three IT assets are perceived highly interdependent and mutually reinforcing. The human asset is characterised as an IT staff that consistently deliver business solutions and exploits business opportunities through information technology. Three dimensions are identified to this asset in the research: technical skills, business understanding, and a problem-solving orientation. The technology asset, including sharable technical platforms and

databases, has two distinguishing characteristics: a well-defined technology architecture and data and platform standards. The third asset of valuable relationship refers to the shared risks and responsibilities for the effective IT use between IT unit and business unit management. This asset consists of business partner ownership of IT, accountability for all IT projects, and top management leadership in IT priorities investment.

Based on the analysis of a two-year study of IT management practices, the authors suggest that the quality of the three key IT assets defines the quality of IT planning, delivery, and support processes, which then affects a firm's ability to deploy IT to achieve its strategic goals.

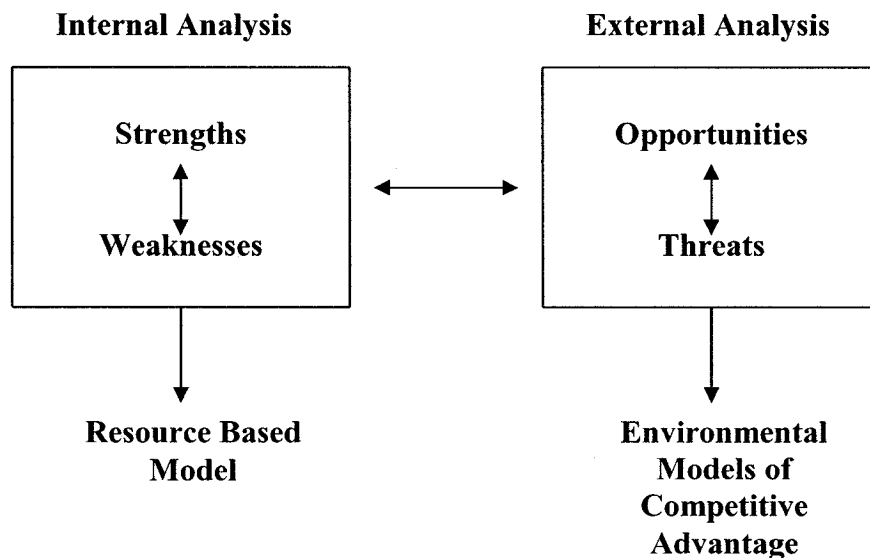
2.1.5 Competitive or Complementary

While some researchers attempt to compare and contrast the fundamental divergence between Porter's framework and the resource-based view theory, an important stream of research (i.e. Wernerfelt, 1984; Henderson and Mitchell, 1997; Spanos and Lioukas, 2001) endeavours to empirically analyze the variation of firms' performance and investigates the relative impact of industry vs. firm's resources and capabilities.

It is argued that the resource-based approach, focusing on development and combination of firm-specific resources and capabilities to meet the goal of competitive advantage, represents the "Strengths-Weaknesses" part of the

SWOT framework, while industry analysis addresses the “Opportunities-Threats” part vis-à-vis (Foss, 1996). In this perspective, the two theories are therefore complementary in that they are like two sides of a coin, covering different application domains, both internal and external, within the context of SWOT analysis, shown in Figure 4.

Figure 4. SWOT Analysis



2.1.5.1 Wernerfelt (1984)

In this study, the author attempts to develop some simple economic tools to analyze a firm’s resource position and then addresses strategic options based on this analysis. The usefulness of analyzing firms from the resource perspective rather than from the product perspective is fully explored. Resource, in this study, refers to anything which could be perceived to be a strength or weakness of a

firm. Or a firm's resources consist of both tangible and intangible assets, relatively stable to the firm at a given time (Caves, 1980).

For the purposes of analysis, Porter's five competitive forces (Porter, 1980) framework is utilized to analogize the concepts of resource position barrier and resource-product matrices to that of entry barriers and growth-share matrices. The author then utilizes the tools to emphasize the new strategic options emerging from the resource perspective.

The author states that an entry barrier without a resource position barrier results in the firm subject to different new entrants, vis-à-vis a resource position barrier without an entry barrier hinders the firm from employing the barrier. The resource-product matrix indicates the relative importance of resources in products or (and) vice versa. As a very powerful tool, it is utilized to illustrate several different patterns of resource development: sequential entry, exploit and develop, and stepping stones.

In short, from a different perspective, this paper explores strategic options, especially those open to diversified firms, by attempting to analyze firms in terms of their resources rather than in terms of their products.

2.1.5.2 Henderson and Mitchell (1997)

In this paper, the authors criticize the fruitlessness of debate in the strategic management field in comparing firm-level and industry-level influences. The researchers contend that both organization and competition are important in driving strategy and achieving performance. They also posit that much of the existing research is inconclusive, thus fail to reveal the fact of fundamentally endogenous relationships amongst organizational capabilities, competition, strategy, and performance. In other word, at multiple levels of analysis, interactions between the environment and the firm define business strategy and determine performance, while interactions between strategy and performance, vice versa, influence both organizational capabilities and competitive environments.

The authors then state that organizational capabilities are designed as well as aroused as the by-products of firm operations as the firms operate in competitive, institutional, and cognitive environments. A firm's reaction to changes in the environments is thus subject to its organizational capabilities, managers' understanding of such organizational capabilities, and the historical context as well. Vice versa, the reactions and firm performance shape the industry structure, and all these changes further create new information from which new learning opportunities emerge.

Finally, the authors draw a conclusion that the next great opportunities for the field of strategy research lie in the careful study of how capabilities and competition mutually affect each other.

2.1.5.3 Spanos and Lioukas (2001)

In this article, the authors explore a few fundamental issues of the influence of industry and firm-specific factors on firms' sustainable competitive advantage, emerging increasingly in the strategic management area. The authors investigate these issues by referring to the contention of the Porter's framework of competitive strategy and the assertion of the resource-based view of firms, two dominating perspectives in the literature of strategic management for over two decades.

The authors develop a comprehensive framework to depict the different causal logic of these two perspectives in terms of the determinants of sustainable above average firm performance. The authors then propose three different but complementary classes of effects on firm performance: (1) strategy effects, (2) industry effects, and (3) firm-assets effects. The model is tested by analyzing data from structured questionnaires completed by 187 CEOs in Greek manufacturing firms, which employ more than twenty people. The response rate is 17%. The authors conduct path analysis by utilizing the maximum likelihood estimation method to investigate the structural relationship among the constructs in the conceptual framework.

The findings suggest the co-existence of three distinct but also complementary classes of effects. The three classes are all important and supplement one another in explaining different dimensions of performance. Market performance and profitability are influenced by industry forces, while firm assets have great impact on market performance, and via the latter, on profitability.

2.1.6 Competitive or Complementary in IT Context

Both the market-driven perspective and the resource-based view of the firm have been dominating in the field of strategic management as two theoretical foundations, which numerous research draws from, regarding the relationship between IT and business performance. Two independent research streams have developed from these two perspectives. Some researchers (i.e. Duhan et al., 2001) characterize them as competing views. On the other hand, some researchers (i.e. Rivard et al., 2006), however, depict them as two complementary perspectives.

2.1.6.1 Duhan et al. (2001)

These authors investigate the role of IS as firm resources and the role of such IS resources in small and medium enterprises (SMEs) in this article. The identification and development of an information systems strategy (ISS) in a knowledge-based SME are utilized as the vehicle to study the role of IS in

enabling competitive advantage. It is perceived that knowledge-based firms normally utilize systemic, knowledge-based resources as the prime competitive tools. The researchers therefore compare the use of core competencies or capabilities, a key aspect of resources as a basis for an ISS with the use of the value chain, a generic structural approach, in the context of SMEs.

A qualitative research approach is used in this study. The researchers conduct a single case study of participant observation to identify whether the core competence approach to ISS provides a more appropriate approach than the structural approach of value chain for a knowledge-based non-profit organization providing consultancy in social housing. Five business themes are identified for this knowledge-based organization: operations management, knowledge base, marketing support, communications, and control and planning. The first three business themes are found to directly link to core competencies, which assist in leveraging and building business performance.

2.1.6.2 Rivard et al. (2006)

In this article, the authors attempt to study the contribution of IT to firm performance from the perspective of complementarities between the two main perspectives: market driven perspective, specifically the Porter's competitive strategy framework, which views the firms as a 'bundle of strategic activities', and a resource-based view perspective, which views the firms as a 'bundle of unique resources.'

For the purpose of the study, the authors adapt the model proposed by Spanos and Lioukas (2001), which incorporates both a competitive strategy framework and the resource-based view, to depict the role of IT in achieving business performance. To be more precise, the relationship between IT support for business strategy and IT support for firm resources and their effects on firm performance are examined in this model.

To test the model, a survey to CEOs of 700 small- and medium-sized enterprises (SMEs) in Quebec, Canada is conducted. The final 96 complete questionnaires give a 13.7% response rate. The partial-least-squares (PLS) method is chosen to assess the research model. The findings are in line with Tallon et al.'s (2000) view that there are two types of corporate IT goals associated to business strategy: (1) internal goals focused on operational effectiveness, and (2) external goals targeted at strategic positioning. The findings of this study also emphasizes the importance of examining IT contributions to business performance from the perspective of complementarities between the competitive strategy view and the resource-based view.

2.2 Strategic Alignment of IT

The strategic alignment model proposed by Henderson and Venkatraman (1993) argues that organizations should align their components from both business and IT domains in order to improve their business performance. Many researchers

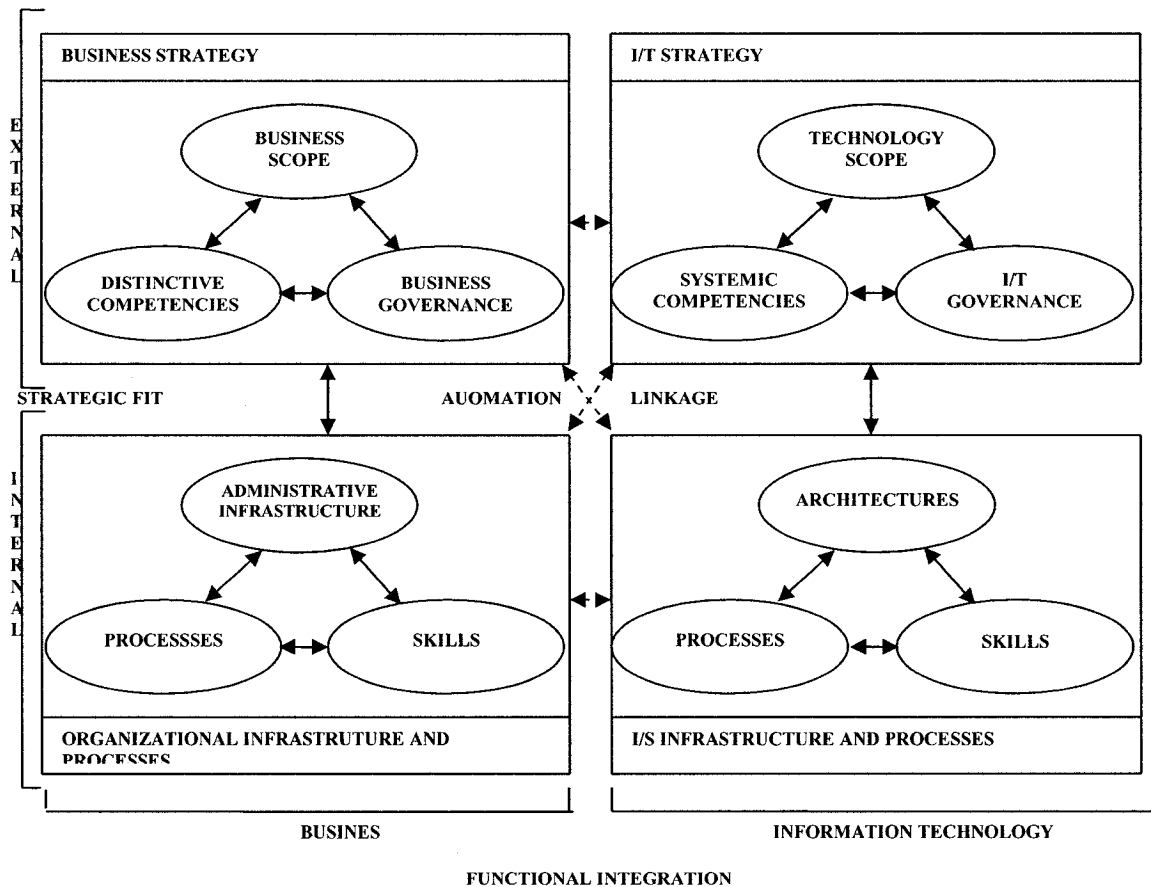
have drawn from this model to study the alignment between business and IT and empirically associate such alignment to firms' business performance.

2.2.1 Strategic Alignment Model

A very important and significant contribution to our understanding of strategic alignment of IT is the Strategic Alignment Model proposed by Henderson and Venkatraman (1993). The model is defined in terms of four fundamental domains of strategic choice: business strategy, information technology strategy, organizational infrastructure and processes, and information technology infrastructure and processes. The Strategic Alignment Model, shown in Figure 5, is built on two blocks: strategic fit (the interrelationship between external and internal components) and functional integration (integration between business and functional domains).

The Strategic Alignment Model distinguishes itself from the traditional views of linkage by calling for a fundamental change of the IT function focus from an internal orientation to an external IT marketplace, a strategic fit both within the IT and business domains, in terms of technology scope, systemic competency, and governance. The authors also emphasize the importance of the selection of appropriate alignment perspectives to best suit the business conditions and organizational objectives.

Figure 5. Strategic Alignment Model by Henderson and Venkatraman (1993)



Four approaches to aligning IT and business domains are suggested. Two of the approaches are driven by business strategy. The strategy execution approach proposes that business strategy is developed to design both organization and IT infrastructure. The technology transformation perspective suggests that business strategy has impact on IT infrastructure through appropriate IT strategy.

The other two cross-domain relationships explore the enabler role of IT strategy. The perspective of competitive potential recommends that emerging IT capabilities impacts business strategy and then organizational infrastructure in

turn. The service level view focuses on the impacts of IT strategy on IT infrastructure and then in turn on organizational infrastructure.

In the view of Rivard et al. (2006), strategic fit requires reconciliation between internal and external business domains and IT domains (IT strategy and IT infrastructure and processes). From the perspective of competitive strategy, functional integration indicates how IT shapes and supports either low-cost, differentiation, or niche strategies. From the resource-based perspective, functional integration reflects how IT supports the development and deployment of the firm's resources.

2.2.2 Empirical Studies

The importance of strategic alignment of information technology is being acknowledged. Many researchers have drawn from this model to study the alignment between business and IT and empirically associate such alignment to firms' business performance, both from an external and an internal perspective (Chan et al., 1997; Luftman et al., 1999; Sabherwal and Chan, 2001; Croteau and Raymond, 2004).

2.2.2.1 Chan et al. (1997)

This study is aimed at improving the understanding of the concept of information systems strategic alignment, more precisely, the fit between business strategic

orientation and information systems (IS) strategic orientation, by developing a set of tools providing information that determines the extent to, and manner in, which information systems fit company strategy.

A conceptual model is proposed in this study to present the proposed relationships between realized (as contrasted with planned) business and IS strategy, alignment, and business performance. It introduces a different approach for interpreting IS strategic alignment and recommends alternative ways for operationalizing this alignment.

A mail survey in North American firms operating in the financial services and manufacturing industries is conducted to collect research data. The result of data analysis of Partial Least Squares (PLS) suggests that holistic system approaches are more suitable than dimension-specific bivariate approaches in explaining business strategic orientation, IS strategic orientation, and IS strategic alignment. The research result reveals three generic IS strategic orientations as IS support for anticipation, IS support for analysis, and IS support for action. The researchers posit that IS effectiveness is more influenced by IS strategic alignment than strategic orientation. Finally, a positive relationship between business strategic orientation, IS strategic alignment, IS effectiveness and business performance is identified.

2.2.2.2 Luftman et al. (1999)

To answer the question that how companies can achieve alignment of business and IT, this study attempts to explore in the field of business-IT alignment and identify the factors that might either help or hinder such alignment based on the results of a multi-year study of strategic alignment. Therefore the objective of this paper is to discover the most prominent enablers and inhibitors to strategic alignment, which emphasizes the management practice and activities in order to achieve firm's alignment goals.

Business and information technology executives from over 500 firms in 15 industries, who also attend the alignment classes held by IBM's Advanced Business Institute, are invited in this study. All the participants are asked to identify activities that are enabling alignment achievement and practices that are inhibiting alignment achievement. The researchers thus analyze all the proposed enablers and inhibitors to alignment in terms of industry, time, and respondents' position in their firms. Six most important enablers, in rank order, are senior executives' support for IT, IT involved in strategy development, IT understands the business, business-IT partnership, well-prioritized IT projects, and IT demonstrates leadership. The six most important inhibitors, in rank order, are IT/business lack close relationship, IT does not prioritize well, IT fails to meet its commitments, IT does not understand business, senior executives do not support IT, and IT management lacks leadership.

The research results also suggest that the process of strategic alignment achievement is dynamic and demands strong senior management support, good working relationships, strong leadership, appropriate prioritization, trust, and effective communication, and a good knowledge of the business environment. Finally, the authors recommend that firms should focus on maximizing the enablers and minimizing the inhibitors in order to achieve strategic alignment of business and IT.

2.2.2.3 Sabherwal and Chan (2001)

Contributing to the literature of IS strategic management, this paper attempts to achieve three goals: (1) to improve the understanding of the performance impacts of the strategic alignment between business and IS, specific to the Miles and Snow's (1978) business strategy typology, considering three types of Defenders, Analyzers, and Prospectors, (2) to investigate the performance impacts of strategic alignment in terms of these three strategy types respectively and analyze whether all these three strategic types influence business performance or only some of the three, (3) to enhance the understanding of the strategic fit between appropriate IS strategies and these three business strategies.

The author develop a priori theoretical framework of these three business strategies by adopting the business strategy measure from the work of Venkatraman's (1989a). This theoretical IS strategy framework incorporates four

types of IS systems, operational support systems, market information systems, strategic decision-support systems, and inter-organizational systems. Data gathered from two separate surveys of CEO, CIO, CFO and VP in North American firms operating in financial services and manufacturing are analyzed in four steps: (1) normalize research variables in terms of industry for each of the two surveys, (2) classify respondent companies into one of the three strategy types, Defenders, Prospectors, and Analyzers, (3) assess the strategic alignment between business and IS, (4) test the four research hypotheses respectively.

Research results show that strategic alignment has affect on perceived business performance, but only in some respondent companies. In organizations of Prospectors and Analyzers, strategic alignment defines the overall business performance. In organizations of Defenders, however, it is not the case.

2.2.2.4 Croteau and Raymond (2004)

In this research, the authors attempt to empirically examine a contingency approach to the strategic fit between the business competencies and IT competencies in a firm and seek to evaluate the influence of the strategic fit or co-alignment on business performance in an organization. A research model is therefore proposed to answer the research question whether business performance can be improved in an organization through the strategic fit or co-alignment of business competencies and IT competencies.

In this paper, strategic competencies, defined by the authors, consist of shared vision, cooperation, empowerment, and innovation. IT competencies are composed of connectivity, flexibility, and technological scanning. Business performance is defined in this research as the contribution of the business and technology domains to the organization's business goals. Fit is defined as a 'pattern of covariation or internal consistency among a set of underlying theoretically related variables', by adopting Venkatraman's (1989b) definition of fit as covariation.

A survey of top managers like CEO and CIO from 104 firms is conducted. Data are then analyzed by utilizing a structural equation modeling tool - EQS program, to examine the impact of aligning an organization's IT competencies with its strategic competencies on business performance. Research results strongly support the strategic alignment conceptualization across two domains of business and IS competencies, as well as confirm that the co-alignment of strategic and IT competencies has a significant influence on business performance improvement in an organization.

2.3 Miles and Snow's (1978) Strategy Typology

Various approaches are adapted to operationalize the concept of business strategy. The typology approach is differentiated by its comprehensiveness and integrative pattern. It has a simple pattern, while simultaneously contribution to systematic strategy concept (Hambrick, 1980). The strategy typology proposed

by Miles and Snow's (1978) is one of the most popular, receiving numerous attention and investigation in literature of strategic management (Conant et al., 1990; Segev, 1987, 1989), and thus is the main concern in this study.

The authors view strategy as a pattern in a firm's decisions, by which the firm aligns itself with its environment. Four business strategies are identified as:

Defenders, Prospectors, Analyzers, and Reactors.

The **Defender** is the most stable among the four types. It has a stable and narrow niche product-market in its industry. Focusing on efficiency of its current operation, it deploys a centralized functional structure internally to offer high-quality and standard products or services at low prices by investments in highly cost efficient but few core technologies. However, the Defender seldom search outside its domain for new opportunities, and rarely makes major adjustments in its technology, structure, or methods of operation.

The **Prospector** is very different from the Defender. It exerts its effort in continuous searching for new product/market opportunities. As the creator of change in its market, the Prospector stresses innovativeness and invests heavily in product R&D and environmental scanning. A de-centralized organizational structure allows it to seek flexibility in technology and to function in broad and dynamic domains. However, the Prospector is not efficient in its operation due to its strong concern with flexibility and innovativeness.

The **Analyzer** incorporates some attributes of the above two strategies. With the strengths of the above two types, it operates in a stable domain of core products and seeks new product/market opportunities at the same time, in order to maximize growth opportunities and minimize risk. It watches its competitors much closely for changes and innovations, by rapidly following the Prospector to introduce competitive products quickly. The Analyzer adopts a matrix organization structure and has a dual technological core to meet conflicting demands of efficiency and innovation. However, it is a great challenge for the Analyzer to handle such conflicting demands simultaneously.

The **Reactor** is the most unstable organization among the four types. It does not respond consistently or effectively to the change and uncertainty of its environment due to its lack of strategy or misalignment between its strategy and its structure. It represents a 'residual' type of behaviour in contrast with the other three types, since the reactor is forced into this kind of response mode due to its lack of strategy compared with Defender, Prospector, and Analyzer. The reactor's unpleasant cycle of responding inappropriately to environmental change and uncertainty result in poor performance and reluctance to act aggressively in the future.

The authors also demonstrate the process of organizations' continuous adjustment to environments, and as well as develop the concept "adaptive cycle"

by which organizations react the environments. This cycle include three components: the entrepreneurial problem (the choice of a given strategy for production-market domain), the engineering problem (the choice of technologies and capabilities for production and distribution), and the administrative problem (the design of organizational structures and processes).

Based on the classic strategy typology, Miles and Snow (1984) further explore the consistency of the adaptive cycles and their effectiveness to organizational performance. To explain the dynamics of organizational adaptation, the researchers propose the concept of fit, which refers to the effort, understanding, and expression of an organization to align its strategy, structure and process. The researchers then link business strategic typology to different degree of fit. Reactors represent misfit, by showing inconsistency in alignment among strategy, structure, and process externally and internally, which results in their failure. The other three strategic types, Defender focusing on internal efficiency, Prospector external-oriented, and Analyzer involving both, make organizations perform well or lead to excellence.

To summarize, Miles and Snow's (1978) strategy typology contributes to the research field of typology approach to operationalizing organizational strategy. The first three strategy types are stable and in a continuum, with Defender and Prospector at the two ends of a continuum, Defender focusing on efficiency and Prospector on innovation. Analyzer demonstrates a mixed position between

Prospector and Defender. Reactor, however, is regarded out of the continuum due to lack of strategy. For the purpose of this study, only the first three strategy types – Defender, Prospector, and Analyzer will be investigated.

2.4 Wade and Hulland (2004) IS Resource Typology

Wade and Hulland (2004) borrow Day's (1994) approach to sorting a firm's IS resources into three types of processes: **Inside-Out**, **Outside-In**, and **Spanning**. Day (1994) proposes that Inside-Out resources are deployed from inside the organization to meet market requirements and utilize opportunities. Such resources are internally oriented, including technology development and cost controls, while Outside-In resources are perceived by Day (1994) as externally oriented. With two attributes as market responsiveness and managing external relationships, an organization's Outside-In resources are deployed for the purpose to anticipate market requirements, establish long term customer relationships, and understand the behaviour of its competitors. The third process of Day (1994) approach is Spanning resources which incorporate both internal and external analysis. Spanning IS resources, with two attributes of managing IS/business partnerships and IS management and planning, are utilized in order to consolidate the organization's Inside-Out and Outside-In IS resources. Table 1, quoted from Wade and Hulland (2004), shows eight key IS resources organized within this framework.

The authors depict each of the resources in more details. Within the Outside-In process, the external relationship management resource refers to the organization's ability to manage relationships between its internal IS function and outside stakeholders, including suppliers, outsourcing partners, and customers. Such capability of relationship management is a significant resource to drive the organization to competitive advantage and superior business performance. The other key Outside-In IS resource is market responsiveness which refers to the information collection from external sources outside of the organization, the market intelligence dissemination among all the departments in the organization, the firm's response to market intelligence learning, the organization's quick project development and management, rapid reaction to market changes, and strategic flexibility.

Table 1. A Typology of IS Resource of Wade and Hulland (2004)

Outside-In	Spanning	Inside-Out
<ul style="list-style-type: none"> • External relationship management • Market responsiveness 	<ul style="list-style-type: none"> • IS-business partnerships • IS planning and change management 	<ul style="list-style-type: none"> • IS infrastructure • IS technical skills • IS development • Cost effective IS operations

One of the Spanning IS resource, IS-business partnerships resources reflect the integration and/or alignment between the IS function and other functional departments in the firm, which help achieve competitive advantage and business performance by bridging the traditional gaps among departments. Organizations also exploit their IS planning and change management resources, the other key

Spanning IS resources, to plan and manage appropriate technology architectures and standards. Such resources present the ability to anticipate changes, to choose appropriate platforms to accommodate changes, to understand how to utilize technologies and how to motivate and manage IS personnel in the process of changes.

Within the Inside-Out IS resources, IS infrastructure resources include off-the-shelf computer hardware and software, which are perceived not to be a source of sustained competitive advantage for organizations due to its ease of imitation, mobility and non-rarity. Another key Inside-Out IS resource is IS technical skills, which consist of current technical knowledge and the ability to deploy and manage such knowledge, and reflect the appropriate and updated technology skills of the firm's IS employees in hardware and software. IS development resources represent the firm's capability to develop and experiment with new technologies and the organization's alertness to emerging technologies and trends, which could be adopted by organizations as a vehicle to achieve competitive advantages. The last key Inside-Out IS resources are cost effective IS operations, which refers to the continuous ability to provide efficient and cost-effective IS operations. Greater efficiency reduces an organization's costs, establishes the cost leadership for the firm in the industry and therefore helps achieve a sustainable competitive advantage. The ability to develop and manage effective IT systems of appropriate quality is perceived to enhance business performance.

2.5 Linkage between These Two Typologies

Research to study the relationship between Miles and Snow's strategy typology and IT/IS resource typology is not much. Among of those studies, there are two articles investigating relationship between Miles and Snow's strategy typology and information technology deployment (Croteau and Bergeron, 2001) and relationship between Miles and Snow's strategy typology and information technology capabilities (Benedetto and Song, 2003).

2.5.1 Croteau and Bergeron (2001)

This empirical study is aimed to explore technological deployment profiles specific to various business strategy types which could drive organizations to superior business performance. A research model addressing three hypotheses is developed to answer the research question what profile of technological deployment specific to a certain type of business strategy an organization should pertain to best improve its business performance.

Business strategy is defined in this study as the outcome of decisions the organization leaders make as the guidance for the organization in light of the environment, structure and processes, which have impacts on the organization's business performance. Miles and Snow's (1978) typology, which is composed of four different business strategy types as prospector, analyzer, defender and

reactor, is applied in this study. Technological deployment in this article refers to how organizations plan and manage information technology for the purpose of achieving competitive advantage. It consists of seven components as strategic use of information technology, management of information technology, role of IS department, technological infrastructure, organizational infrastructure, administrative infrastructure, and technological scanning. Organizational performance is examined by using both objective and subjective data: sales growth, market share gains and financial liquidity position.

Both CEOs and CIOs from 223 Canadian organizations complete two questionnaires respectively, giving a response rate of 11.4%. Data are then analyzed by using a Partial Least Squares (PLS) tool. Results of the study suggest that there are various profiles of technological deployment including the following attributes: the strategic impact of the information system department, the technological architecture, the information system performance evaluation and technological scanning. To be specific, the analyzers have an outward technological deployment profile, which contributes directly to their business performance. In contrast, an inward technological deployment profile is found in organizations conducting prospector strategic activities to have an indirect contribution to business performance.

2.5.2 Benedetto and Song (2003)

In this paper, the authors attempt to demonstrate that organizations carrying out different strategic activities in terms of Miles and Snow's (1978) strategic typology have different capability profiles. It is proposed that firms involved in certain strategic activities tend to have certain capabilities which are relative more important for them to enhance business performance in the Chinese business environment.

For the purpose of this study, organizational capabilities are defined as the multiple capabilities across areas in an organization to enhance business performance. With the attributes of scarcity, immobility, and non-imitation, such capabilities drive the organization to achieve sustainable competitive advantage and superior performance. Information technology capabilities, adopted from Day (1990, 1994) and Day and Wensley (1988), refer to having systems to facilitate integration across all functional areas, internal communication, technology innovation, market knowledge creation, which ensure the effective disseminations of market information among different functions or departments within the organization and the effective new product development.

The authors develop their propositions by stating that prospectors will have the greatest relative inside-out capabilities and information technology capabilities, and defenders the lowest, along the prospectors-analyzers-defenders continuum. In the researchers' eyes, although outside-in capabilities are important for

prospectors, the abilities of technological change forecasting and new products development, which are perceived by the researchers as typical inside-out capabilities, are what ensure prospectors continuous searching and competitive success. Therefore, the researchers propose that inside-out capabilities are relatively more important to prospectors, outside-in capabilities are relatively more important to defenders, and analyzers fall in between.

To empirically test propositions, the researchers collect data from 245 Chinese firms, which are almost all state-owned enterprises, and perform factor analysis. Research results show that all the propositions are supported. In conclusion, the authors state that prospectors tend to have greater relative inside-out capabilities and information technology capabilities, while defenders tend to have greater relative outside-in capabilities and marketing capabilities.

2.6 Literature Review Summary

From the above literature review in both organizational strategy and IS resource areas, we come to the following conclusion. First of all, two perspectives of studying organizational strategy, competitive advantage theory versus resource-based theory, or external versus internal, are well documented as well as their application in the information technology context. Next, competitive and complementary roles of these perspectives are discussed. Both competitive advantage theory and resource-based theory are complementary by covering different domains with the context of SWOT analysis. Third, in IS literature,

theoretical foundations and empirical research in the field of strategic alignment of IT is well documented. Miles and Snow's strategic typology has been used and validated in the strategic alignment of IT literature. Finally, there is no research examining the linkage between Miles and Snow's strategic typology and Wade and Hulland's IS resource typology, although Croteau and Bergeron (2001) investigate relationship between Miles and Snow's strategy typology and information technology deployment, and Benedetto and Song (2003) examine relationship between Miles and Snow's strategy typology and information technology capabilities. We can conclude that further research is needed to investigate the linkage between Miles and Snow's (1978) strategic typology and Wade and Hulland's (2004) IS resource typology in the strategic alignment of IT field.

3. Methodology

3.1 Research Question & Hypotheses

Based on the above literature review, this study is aimed to explore whether there is a link between an organization's strategy type based on Miles and Snow's typology (1978) and an organization's IS resource type as proposed by Wade and Hulland (2004). This study addresses the following research question: How a type of business strategy adopted by an organization is related to its IS resource profile?

This research question is tested across three hypotheses as following:

H1: Prospectors are more prone to possess Outside-In IS resources than Analyzers and Defenders.

Unlike the Defenders and Analyzers, prospectors are external-oriented with an innovativeness focus, continuously seeking new product/market opportunities, creating changes in their markets and pursuing flexibility in technology in order to function in broad and dynamic domains. It is perceived in Croteau and Bergeron (2001) that a flexible and open technological architecture is important for prospectors to practise innovation and bring changes in their industry. Outside-In IS resources are externally oriented, placing an emphasis on anticipating market requirements, creating durable customer relationships, and understanding competitors. Therefore, it is expected that such profile of IS resources better supports prospectors' strategy of finding new ideas, launching new products and/or services, and creating changes in their industries than Spanning and Inside-Out IS resource.

H2: Analyzers are more prone to possess Spanning IS resources than Prospectors and Defenders.

Analyzers, combination of the Prospector and Defender types, involve a dual-focus of both external-oriented and internal efficiency. Analyzers seek to

minimize risk while maximizing opportunities for growth and profit (Miles and Snow, 1978). It is validated in Sabherwal and Chan (2001) that alignment between business strategy and IS for comprehensiveness strategy enhances business performance for analyzers. Spanning IS resources, involving both internal and external analysis, integrate a firm's Inside-Out and Outside-In IS resources. Thus, it is expected that Spanning IS resources better support analyzers' strategy of simultaneously minimizing risk while maximizing opportunities for profit and growth than either Outside-In or Inside-Out IS resources alone.

H3: Defenders are more prone to possess Inside-Out IS resources than Prospectors and Analyzers.

Contrast with Prospectors, Defenders are internal efficiency focused, with stable and narrow niches in their industry by offering high-quality standard products or services at low prices, and stressing operational efficiency and economies of scale. They do not tend to search outside their domain for new opportunities, and rarely make major adjustments in structure or technology (Miles and Snow, 1978). Inside-Out IS resources, referring to those deployed from inside the firm in response to market requirements and opportunities, tend to be internally focused by emphasizing efficient and cost-effective IS operations. Therefore, it is expected that Inside-Out resources better support Defenders' strategy activities

of improving efficiency of their existing operations than Outside-In and Spanning IS resources.

3.2 Research Constructs and Variables

This paper investigates the two basic constructs: business strategy and IS resource. We will discuss these two main constructs and define related variables in this section.

3.2.1 Business Strategy

Business strategy, defined in Croteau and Bergeron (2001), is the outcome of decisions made to guide an organization with respect to the environment, structure and processes that influence its organizational performance. In this paper, we apply Miles and Snow's (1978) strategic typology, which is used in many studies to measure organizational strategy (Sabherwal and Chan, 2001; Croteau and Bergeron, 2001; Benedetto and Song, 2003).

Miles and Snow's (1978) typology consists of four types of business strategy defined as prospector, analyzer, defender and reactor. The first three strategy types are stable in a continuum and expected to enhance organizational performance, with Defender and Prospector at the two ends and Analyzer in the middle. Reactor, however, is regarded out of the continuum due to lack of strategy and impeding organizational performance. For the purpose of this study,

only the first three strategy types – Defender, Prospector, and Analyzer will be investigated.

3.2.2 IS resource

Viewed by Bharadwaj (2000) as potential sources of competitive advantage, IS resources consist of the tangible resources comprising the physical IT infrastructure components, the human IT resources comprising the technical and managerial IT skills, and the intangible IT-enabled resources such as knowledge, customer orientation, and synergy.

Borrowing Day's (1994) approach, Wade and Hulland (2004) classify a firm's IS resources into three types of processes: Inside-Out, Outside-In, and Spanning. Inside-Out IS resources are deployed from inside the firm in response to market requirements and opportunities, and tend to be internally focused (e.g., technology development, cost controls). In contrast, Outside-In IS resources are externally oriented, placing an emphasis on anticipating market requirements, creating durable customer relationships, and understanding competitors (e.g., market responsiveness, managing external relationships). Finally, Spanning IS resources, which is believed to involve both internal and external analysis, are needed to integrate the firm's Inside-Out and Outside-In IS resources (e.g., managing IS/business partnerships, IS management and planning).

3.3 Operationalization and Measurement

3.3.1 Business Strategy

As set forth by Snow and Hambrick (1980), there are four different approaches for identifying and measuring business strategies. The four measurement methods are: (1) investigator inference, (2) self-typing, (3) external assessment, and (4) objective indicators. We use the self-typing approach, which has the advantages: (1) top managers' perceptions and opinions largely determine the organization's strategy, and (2) relatively large data bases can be generated for hypothesis testing. There are many researchers using the self-typing approach to operationalize the Miles and Snow's typology. Among those, Segev (1987) and Smith et al. (1986) use self-typing method complemented by investigator-specified decision rules. Shown in Table 2, Segev (1987) utilizes multi-item, close-ended scales, the overall degrees to which a firm's strategy conformed to the defender, prospector, analyzer, and reactor types are inferred based on multi-item (Likert-type) scales developed to measure each of the four strategy types.

In this study, though the hypotheses only cover the first three types of strategy, we will examine the four types of business strategy: Prospector, Analyzer, and Defender, and Reactor by partially adopting Segev's (1987) instrument items (Reactor type is not included in this study). All first nine items of defenders, the next seven items of prospectors, the four items (A1, A4, A5, and A6) of analyzers,

and the three items (R1, R2, and R3) of reactors are adopted, which makes a total of twenty-three items to measure a firm's strategy type.

Table 2. Measures of Strategic Type by Segev's (1987)

Item #	Strategic Type	Instrument Description
D1	Defender	The firm tries to locate a safe niche in a relatively stable products domain.
D2	Defender	The firm tries to maintain a safe niche in a relatively stable products domain.
D3	Defender	The firm tends to offer a narrower set of products than its competitors.
D4	Defender	The firm tries to protect the environment domain in which it operates by stressing higher quality than its competitors.
D5	Defender	The firm tries to protect the environment domain in which it operates by stressing lower prices than its competitors.
D6	Defender	The firm concentrates on trying to achieve the best performance in a relatively narrow product-market domain.
D7	Defender	The firm places less stress on the examination of changes in the industry that are not directly relevant to the firm.
D8	Defender	The firm tries to maintain a limited line of products.
D9	Defender	The firm tries to maintain a stable line of products.
P1	Prospector	The firm leads in innovations in its industry.
P2	Prospector	The firm operates in a broad product domain.
P3	Prospector	The firm product domain is periodically redefined.
P4	Prospector	The firm's believes in being 'first-in' in the industry in development of new products.
P5	Prospector	Not all the firm's efforts invested in being 'first-in' in the industry in development of new products prove to be profitable.
P6	Prospector	The firm responds rapidly to early signals of

		opportunities in the environment.
P7	Prospector	The firm's actions often lead to a new round of competitive activity in the industry.
P8	Prospector	The firm doesn't maintain market strength in all the areas in which it operates.
A1	Analyzer	The firm adopts quickly promising innovations in the industry.
A2	Analyzer	The firm tries to maintain a limited line of products.
A3	Analyzer	The firm tries to maintain a stable line of products.
A4	Analyzer	The innovations which are chosen by the firm are carefully examined.
A5	Analyzer	The firm often reacts to innovations in the industry by offering similar, lower-cost products.
A6	Analyzer	The firm carefully monitors competitors' actions in the industry.
A7	Analyzer	The firm only seldom leads in developing new products in the industry.
R1	Reactor	Compared to its competitors in the industry, the firm is aggressive in maintaining its product/market domain.
R2	Reactor	The firm takes many risks.
R3	Reactor	The firm responds to areas in which pressure is made on it by its environment.
R4	Reactor	During the game the firm maintained a consistent product/market definition.

3.3.2 IS resource

Wade and Hulland (2004), borrowing Day's (1994) approach, classify a firm's IS resources into three types of processes: Outside-In, Spanning, and Inside-Out.

Eight key IS resources (external relationship management, market responsiveness, IS-business partnerships, IS planning and change management, IS infrastructure, IS technical skills, IS development, and cost effective IS

operations) are identified and organized within the framework of three types of processes, shown in table 1.

To operationalize a firm's IS resource type, we adopt the 53 measurement items of technological deployment in Croteau and Bergeron (2001), shown in Table 3. Technological deployment, defined by Croteau and Bergeron (2001), refers to the way companies plan and manage information technology to benefit from its potential and effectiveness. This definition of technological deployment, consisting of seven components as strategic use of information technology, management of information technology, role of IS department, technological infrastructure, organizational infrastructure, administrative infrastructure, and technological scanning, covers the concept of IS resource.

Table 3. Measures of Technological Deployment by Croteau and Bergeron (2001)

Item #	Measurement Description
1.	Information systems (IS) are used for competitive advantage by our firm.
2.	IS department facilitates business process reengineering.
3.	IS department manages business process reengineering.
4.	Information systems effectiveness is measured.
5.	Information systems productivity is measured.
6.	Decision and executive support systems are broadly used throughout our firm.
7.	Our firm communicates business information to its partners via electronic data interchange (EDI).
8.	Distributed systems (client/server) are broadly used throughout our

	firm.
9.	CASE technology is used by IS department members.
10.	Our organizational level of computerization is high.
11.	Information technologies implemented are well integrated to the organizational tasks.
12.	Information systems strategic planning is defined in relation with the business objectives of our firm.
13.	IS department position is determined accordingly to the structure and needs of our firm.
14.	IS department prioritizes the effectiveness and quality of software development.
15.	IS department plans and manages for effective and flexible communication networks.
16.	Contributions of the IS department are expected to be high.
17.	IS department contributes to business growth.
18.	Most information systems project teams members come from the IS department.
19.	IS project teams group people from various departments, including the IS department.
20.	IS department has a strategic impact on our firm.
21.	Information systems are centralized.
22.	Information systems are decentralized.
23.	IS department designs and implements an information architecture that guides applications development.
24.	IS department designs and implements an information architecture that facilitates the integration and sharing of data.
25.	IS department integrates multi-vendor open systems technologies.
26.	IS department contributes to the effective use of the data resource.
27.	Technological architecture is designed to respond to our business needs.
28.	IS department adequately plans and manages existing applications portfolio.
29.	IS department improves information security and control.
30.	IS department sets disaster recovery capabilities.
31.	Information systems are primarily developed in-house.

32.	Information systems are primarily developed by external resources.
33.	Some selected information services are outsourced.
34.	Technological infrastructure adequately supports managerial tasks.
35.	IS project team structure varies with respect to the business function for which the IS project is developed (finances, marketing, etc.).
36.	IS project team structure varies with respect to the type of IS projects.
37.	IS project members are selected on the basis of their technical expertise.
38.	IS project members are first chosen for their interpersonal skills.
39.	Authoritative style in the IS project team is preferred.
40.	Participative style in the IS project team is preferred.
41.	Flexible approach is encouraged in IS project management.
42.	Formal approach is encouraged in IS project management.
43.	IS department trains itself human resources.
44.	IS department recruits already trained human resources.
45.	Expertise and capabilities of IS department employees contribute to organizational strategic goals.
46.	IS department employees are looking for economical ways to process information.
47.	IS department employees design and implement applications that allow the firm to differentiate itself from competitors.
48.	IS department employees design and implement applications that reduce organizational operations costs.
49.	IS department employees participate to organizational meetings.
50.	IS department employees read technological journals on a regular basis.
51.	IS department employees attend information systems associations meetings.
52.	IS department employees learn continuously about new technologies and technological applications.
53.	Continuous learning about ways to integrate new technologies is encouraged by our firm.

For the purpose of this study, item no. 10, 13, 16, 20, 29, 30, 34, 38, 40, 45, 51, and 53 are withdrawn after a card sorting approach, which will be discussed in section 4.3. Finally, there are 41 items in total to measure a firm's IS resource type. The results of card sorting are shown in appendix.

4. Data Collection and Analysis

4.1 Sample and Data Collection

Data of strategy type and technological deployment were previously collected in 1996 by Croteau and used in the study of Croteau and Bergeron (2001). The dataset contains items of strategy types, adopted from Segev's (1987) instruments, and items of technological deployment, extracted from Das et al. (1991), Bergeron and Raymond (1995) and Janz et al. (1996) and designed by Croteau and Bergeron (2001).

The data were collected through questionnaires addressed to the Chief Executive Officers and Chief Information Officers in 1949 Canadian firms with more than 250 employees. 223 companies returned valid questionnaires, making the final response rate as 11.4%. The sampled firms are mostly from the manufacturing, service, and finance industries.

4.2 Analysis of Strategy Coding

The coding rule is adopted from Conant et al. (1990). The scale level of data produced by the multiple-option questions requires that categorization be based on a 'majority-rule' decision structure. Thus, organizations are classified as defenders, prospectors, analyzers, or reactors, depending on the archetypal response option that is selected most often. Conant et al. (1990) also employ decision rules in case of ties two separate, but related. Specifically, ties between defender, prospector, and/or analyzer response options result in the organization being classified as an analyzer, while any ties involving reactor response options result in the organization being categorized as a reactor. Conant et al. (1990) posit that both of the decision rules involving ties are theoretically anchored in Miles and Snow's original conceptualization of the four archetypes. Analyzers, according to Miles and Snow (1978), are 'hybrid' organizations and, as such, emerge possessing both defender and prospector characteristics. In contrast, reactors respond inconsistently to the challenges of the adaptive cycle, perhaps behaving like defenders when conducting environmental surveillance, prospectors when developing new products, and analyzers when controlling and evaluating their performance.

Four types of business strategy (prospector, analyzer, defender, and reactor) are examined in Croteau and Bergeron (2001), using the 23 items of Segev's (1987) instrument rated on a Likert-type scale varying from 1 to 7 (highly disagree to highly agree). Among the 23 items, R1 and R2 are reversed scales.

A few steps are taken to categorize the sample organizations, applying the decision rule proposed by Conant et al. (1990). The first step is to reverse item R1 and R2. The second step is then to calculate the average scores of items grouped by strategy type for each sample organization, named Average-D, Average-P, Average-A, and Average-R. The third step is to find the biggest one among the four average scores. Organizations with the highest Average-P, are categorized as Prospectors; Organizations with the highest Average-A, are categorized as Analyzers; Organizations with the highest Average-D, are categorized as Defenders; Organizations with the highest Average-R, are categorized as Reactors. There are three organizations with ties between prospector and analyzer response options. According to the decision rule of Conant et al. (1990), the three organizations are classified as Analyzers. Among the 223 companies, 81 Prospectors, 90 Analyzers, 28 Defenders, and 24 reactors are found, shown in Table 4. After 24 reactors are withdrawn from the sample, 199 companies are left for the purpose of this study.

Table 4. Results of Strategy Type Coding Analysis

Strategy Type	Number of Companies	Percentage
Prospector	81	40.7%
Analyzer	90	45.2%
Defender	28	14.1%
Total	199	

4.3 Analysis of IS Resource Coding

Three types of IS resource (outside-in, spanning, and inside-out) are also examined by adopting 53 items of technological deployment in Croteau and Bergeron (2001), which are also rated on a Likert-type scale varying from 1 to 7 (highly disagree to highly agree). Among the 53 items, item no. 22, 32, 39, 41, 42 and 44 are reversed scale.

To classify the 53 items into one of the three types of process: Outside-In, Spanning, and Inside-Out, proposed by Wade and Hulland (2004), a card sorting approach is utilized in this study. There are a few steps of card sorting method to categorize the 53 measurement items by IS resource type. First, nine MSc (Master of Science) students at John Molson School of Business in Concordia University are invited. An explanation letter is sent to each respondent, instructing how to classify the 53 measurement items by IS resource type. Definitions of three general categories (Outside-In, Spanning, and Inside-Out) and eight subcategories (external relationship management, market responsiveness, IS-business partnerships, IS planning and change management, IS infrastructure, IS technical skills, IS development, cost effective IS operations) are also stated in the explanation letter. The respondents are required to fully understand the definitions before they try to classify the measurement items into one of the eight sub-categories if possible, and then classify measurement items into one of the three general categories if they can not be grouped into the eight

sub-categories. Items, which can not be grouped into either the eight sub-categories or the three general categories, are left into the “Not Sure” group, which are withdrawn from the study.

Items with the majority agreement in the Outside-In category are classified as Outside-In measurement items; Items with the majority agreement in the Spanning category are classified as Spanning measurement items; Items with the majority agreement in the Inside-Out category are classified as Inside-Out measurement items. Finally, item no. 10, 13, 16, 20, 29, 30, 34, 38, 40, 45, 51, and 53, are withdrawn. 41 items in total are left and categorized by a firm’s IS resource type, shown in Table 5.

Table 5. Results of Card Sorting Approach – Classification of Measurement Items by IS Resource Type

Item #	IS Resource Type	Measurement Description
O1	Outside-In	Information systems (IS) are used for competitive advantage by our firm.
O2	Outside-In	Our firm communicates business information to its partners via electronic data interchange (EDI).
O3	Outside-In	IS department integrates multi-vendor open systems technologies.
O4	Outside-In	Some selected information services are outsourced.
O5	Outside-In	IS department employees design and implement applications that allow the firm to differentiate itself from competitors.
S1	Spanning	IS department facilitates business process reengineering.
S2	Spanning	IS department manages business process reengineering.

S3	Spanning	Information technologies implemented are well integrated to the organizational tasks.
S4	Spanning	Information systems strategic planning is defined in relation with the business objectives of our firm.
S5	Spanning	IS department contributes to business growth.
S6	Spanning	Most information systems project teams members come from the IS department.
S7	Spanning	IS project teams group people from various departments, including the IS department.
S8	Spanning	IS department designs and implements an information architecture that facilitates the integration and sharing of data.
S9	Spanning	Technological architecture is designed to respond to our business needs.
S10	Spanning	IS department adequately plans and manages existing applications portfolio.
S11	Spanning	IS project team structure varies with respect to the business function for which the IS project is developed (finances, marketing, etc.).
S12	Spanning	IS project team structure varies with respect to the type of IS projects.
S13	Spanning	Authoritative style in the IS project team is preferred.
S14	Spanning	Flexible approach is encouraged in IS project management.
S15	Spanning	Formal approach is encouraged in IS project management.
S16	Spanning	IS department employees participate to organizational meetings.
I1	Inside-Out	Information systems effectiveness is measured.
I2	Inside-Out	Information systems productivity is measured.
I3	Inside-Out	Decision and executive support systems are broadly used throughout our firm.
I4	Inside-Out	Distributed systems (client/server) are broadly used throughout our firm.
I5	Inside-Out	CASE technology is used by IS department members.
I6	Inside-Out	IS department prioritizes the effectiveness and quality of software development.
I7	Inside-Out	IS department plans and manages for effective and flexible

		communication networks.
I8	Inside-Out	Information systems are centralized.
I9	Inside-Out	Information systems are decentralized.
I10	Inside-Out	IS department designs and implements an information architecture that guides applications development.
I11	Inside-Out	IS department contributes to the effective use of the data resource.
I12	Inside-Out	Information systems are primarily developed in-house.
I13	Inside-Out	Information systems are primarily developed by external resources.
I14	Inside-Out	IS project members are selected on the basis of their technical expertise.
I15	Inside-Out	IS department trains itself human resources.
I16	Inside-Out	IS department recruits already trained human resources.
I17	Inside-Out	IS department employees are looking for economical ways to process information.
I18	Inside-Out	IS department employees design and implement applications that reduce organizational operations costs.
I19	Inside-Out	IS department employees read technological journals on a regular basis.
I20	Inside-Out	IS department employees learn continuously about new technologies and technological applications.

A few more steps are then taken to categorize the sample organizations by IS resource type, applying the same decision rule proposed by Conant et al. (1990). The first step is to reverse item no. 22, 32, 39, 41, 42, and 44. The second step is then to calculate the average scores of items grouped by IS resource type for each sample organization, named Average-Outside-In, Average-Spanning, and Average-Inside-Out. The third step is to find the biggest one among the three average scores. Organizations with the highest Average-Outside-In, are categorized as with Outside-In IS resources; Organizations with the highest

Average-Spanning, are categorized as with Spanning IS resources; Organizations with the highest Average-Inside-Out, are categorized as with Inside-Out IS resources. There is one organization with ties between Inside-Out and Spanning response options. Adopting the decision rule of Conant et al. (1990), this organization is classified as with Spanning IS resources.

Among the 199 companies, 104 companies with Outside-In IS resources, 61 companies with Spanning IS resources, and 34 companies with Inside-Out IS resources are finally identified, shown in Table 6.

Table 6. Results of IS Resource Type Coding Analysis

IS Resource Type	Number of Companies	Percentage
Outside-In	104	52.3%
Spanning	61	30.6%
Inside-Out	34	17.1%
Total	199	

4.4 Linking Strategy with IS Resource

After the coding of both strategic type and IS resource type, the last step of data analysis is to link Miles and Snow's strategy type with Wade and Hulland's IS resource profile among the 199 sample organizations. A detail summary of the distribution of the companies is shown in Table 7.

Table 7. Linkage between IS Resource Typology and Miles and Snow's Strategic Typology

	Outside-In	Spanning	Inside-Out	Sub-Total
Prospector	49	20	12	81
Analyzer	46	28	16	90
Defender	9	13	6	28
Sub-Total	104	61	34	Total 199

Among 104 organizations with Outside-In IS resources, 49 (47%) are Prospectors, 46 (44%) are Analyzers, and 9 (9%) are Defenders; Among 61 organizations with Spanning IS resources, 20 (33%) are Prospectors, 28 (46%) are Analyzers, and 13 (21%) are Defenders; Among 34 organizations with Inside-Out IS resources, 12 (35%) are Prospectors, 16 (47%) are Analyzers, and 6 (18%) are Defenders. A detail summary of the distribution of the companies is shown in Table 8.

Table 8. Strategy Type for Wade and Hulland's IS Resource Typology

	Outside-In	Spanning	Inside-Out
Prospector	49 (47%)	20 (33%)	12 (35%)
Analyzer	46 (44%)	28 (46%)	16 (47%)
Defender	9 (9%)	13 (21%)	6 (18%)
Sub-Total	104	61	34

4.5 Statistics Analysis

4.5.1 One Way Analysis of Variance

To investigate the equality of business strategy classification, IS resource categorization, means for business strategy type variable across three types of IS resource profile, and to assess the distinctiveness of each IS resource profile, we apply one-way analysis of variance (ANOVA) to test for differences in the mean value of maximum average scores of strategy type for each sample organization across three types of business strategy (test #1), differences in the mean value of maximum average scores of IS resource profile for each sample organization across three types of IS resource (test #2), and differences in the mean value of business strategy type variable across three profiles of IS resource (test #3).

Analysis of variance is especially useful when researchers are interested in determining whether a particular factor or treatment has an effect on the dependent variable of interest (Lattin et al., 2003). F-test, conducted by using SPSS tool, shows that: (1) Means of the maximum average scores of strategy type differ significantly across the three types of business strategy, which demonstrates the effectiveness of business strategy classification. (2) Means of the maximum average scores of IS resource profile differ significantly across the three types of IS resource, which illustrates the effectiveness of IS resource categorization. (3) Means of business strategy type variable differ significantly across the three groups of IS resource. The results are shown below in table 9.

Table 9. Results of ANOVA

Test#	Influencing factor	Dependent variable	F value	Significance
1	strategy type	Maximum average scores of strategy type	3.767	P=0.025*
2	IS resource type	Maximum average scores of IS resource profile	20.697	P=0.000***
3	IS resource type	strategy type	3.344	P=0.037*

*: p<0.05 ***: p<0.001

Table 10. Result of Games-Howell Test

Test # 1 Dependent variable: Maximum average scores of strategy type	(I) Strategy Type (J) Strategy Type		Mean Difference (I-J)	Sig.
	Prospector	Analyzer Defender	0.1192 0.3398*	0.382 0.010*
	Analyzer	Prospector Defender	-0.1192 0.2206	0.382 0.112
	Defender	Prospector Analyzer	-0.3398* 0.2206	0.010* 0.112
Test # 2 Dependent variable: Maximum average scores of IS resource profile	(I) IS Resource Type	(J) IS Resource Type	Mean Difference (I-J)	Sig.
	Outside-In	Spanning Inside-Out	0.6243* 0.5068*	0.000* 0.001*
	Spanning	Outside-In Inside-Out	-0.6243* -0.1175	0.000* 0.700
	Inside-Out	Outside-In Spanning	-0.5068* 0.1175	0.001* 0.700
Test # 3 Dependent variable: strategy type	(I) IS Resource Type	(J) IS Resource Type	Mean Difference (I-J)	Sig.
	Outside-In	Spanning Inside-Out	0.27* 0.21	0.048* 0.296
	Spanning	Outside-In Inside-Out	-0.27* -0.06	0.048* 0.916
	Inside-Out	Outside-In Spanning	-0.21 0.06	0.296 0.916

*. The mean difference is significant at the 0.05 level.

Added test of significance of pairwise contrasts (Games-Howell test), shown in table 10, reveals that (1) Defenders and prospectors are significantly different from each other with respect to business strategy, while analyzers are not significantly different from either prospectors or defenders. (2) Outside-In is significantly different from both Spanning and Inside-Out in light of IS resource profile, while Spanning is not significantly different from Inside-Out. (3) Outside-in IS resources are more deployed in prospectors, Spanning IS resources are more likely to be possessed by analyzers, while Inside-Out IS resources are not like the other profiles deployed differently among prospectors, analyzers, or defenders.

4.5.2 Reliability Analysis

Reliability analysis is also attempted to investigate the properties of 23 measurement items of business strategy type and 41 measurement items of IS resource type respectively. Cronbach Alpha reflects the internal consistency of the measurement items, based on the average inter-item correlation. SPSS tool is also utilized to conduct reliability analysis.

Results of the reliability analysis for 23 measurement items of business strategy type show that: (1) For the nine items of defender type, α is 0.6157, which is close to the cut-off value 0.7, illustrating the nine items measure the defender type with a moderate reliability. (2) Regarding the seven items of prospector type,

α is 0.6567, which is much close to the cut-off value 0.7, representing a moderate reliability of the seven items to measure the prospector type. (3) With respect to the four items of analyzer type, α is 0.3600, which is smaller than the cut-off value 0.7, failing to show the four items reliably measure the analyzer type. (4) For the three items of reactor type, α is -0.2383, which is also smaller than the cut-off value 0.7.

In terms of analysis for 41 measurement items of IS resource type, the results show that: (1) For the five items of Outside-In IS resource type, α is 0.5599, which is close to the cut-off value 0.7, representing a moderate reliability of the five items to measure the Outside-In IS resource type. (2) Regarding the sixteen items of Spanning IS resource type, α is 0.7290, which is above the cut-off value 0.7, illustrating the sixteen items reliably measure the Spanning IS resource profile. (3) With respect to the twenty items of Inside-Out resource type, α is 0.7770, which also exceeds the cut-off value 0.7, demonstrating the twenty items reliably measure the Inside-Out IS resource profile.

5. Results and Discussion

5.1 Research Results

This study is aimed to answer the research question whether there is a link between Miles and Snow's (1978) strategic typology and Wade and Hulland's

(2004) IS resource typology. To be specific, this paper addresses how a type of business strategy adopted by an organization is related to an IS resource profile.

Hypothesis 1 tests if Prospectors are more prone to possess Outside-In IS resources than Analyzers and Defenders. Supporting evidence is observed and confirmed by statistics analysis. Among 81 Prospectors, over half of them, 49 firms (60%) in fact, are with Outside-In IS resource profile, while 20 firms (25%) are with Spanning IS resource profile, and only 12 firms (15%) are with Inside-out IS resource profile.

Hypothesis 2 investigates if Analyzers are more prone to possess Spanning IS resources than Prospectors and Defenders. Supporting evidence is also observed and confirmed by statistics analysis. Among 61 organizations with Spanning IS resource, 28 companies (46%) are Analyzers, while 20 companies (33%) are Prospectors, and only 13 companies (21%) are Defenders.

Hypothesis 3 tests if Defenders are more prone to possess Inside-Out IS resources than Prospectors and Analyzers. There is no supporting evidence found based on the statistics analysis. Among 28 Defenders, almost half of them, 13 firms (47%) are with spanning IS resource, only 6 firms (21%) are with inside-out IS resource, and 9 firms (32%) are with outside-in IS resource.

5.2 Discussion

5.2.1 Prospector's IS resource Profile

Organizations with prospector strategic activities are external-oriented, continuously seeking new product/market opportunities, and creating changes in their markets. Emphasizing innovativeness, such organizations invest heavily in product R&D and environmental scanning. They also seek flexibility in technology in order to function in broad and dynamic domains.

Outside-In IS resources are externally oriented, with two primary attributes of market responsiveness and managing external relationships, placing an emphasis on anticipating market requirements, creating durable customer relationships, and understanding competitors.

It is understandable that Outside-In IS resources are deployed in these firms to support their strategies of finding new ideas, launching new products and/or services, and creating changes in their industries. This result is also consistent with finding in Croteau and Bergeron (2001), that the prospector has an inward technological deployment, which includes strategic impact of the IS department, such as IS used for competitive advantage, IS contribution to business growth, and IS allowing the firm to differentiate itself from competitors.

5.2.2 Analyzer's IS Resource Profile

Organizations with analyzer strategic activities involve a dual-focus of both external-oriented and internal efficiency, sharing some characteristics with each of the two strategies: prospector and defender. Combining the strengths of the above two types, Analyzers seek to simultaneously minimize risk while maximizing opportunities for growth and profit as well as maintain stable domains of core products, while seeking new product/market opportunities. Analyzers do not usually initiate new products but often follow Prospectors by very quickly introducing competitive, and occasionally better, products. Thus, unlike Defenders, Analyzers do not eschew change, but unlike Prospectors, Analyzers do not create change either.

With two primary attributes of IS/business partnerships management and IS management and planning, Spanning IS resources, which are believed to involve both internal and external analysis, are needed to integrate the firm's inside-out and outside-in resources.

It is understandable that the Spanning IS resources are deployed in these firms to support their strategies of simultaneously minimizing risk while maximizing opportunities for growth and profit, maintaining stable domains of core products while seeking new product/market opportunities, and following the prospectors by very quickly introducing competitive products instead of initiating new products. To some degree, this result is also consistent with finding in Croteau and

Bergeron (2001), that the analyzer has an outward technological deployment, which includes technological scanning that continuous learning about ways to integrate new technologies into business is encouraged.

5.2.3 Defender's IS Resource Profile

Organizations with defender strategic activities, are internal efficiency focused, sealing off stable and predictable but narrow niches in their industry by offering high-quality standard products or services at low prices, stressing operational efficiency and economies of scale, and investing highly in cost efficient but few core technologies. However, they do not tend to search outside their domains for new opportunities, and rarely make major adjustments in their structure or technology.

Hypothesis 3 is to test the proposition that defenders are more prone to have Inside-Out IS resources than prospectors and analyzers. No evidence is found to support hypothesis 3, but defenders are also found to have Spanning IS resources as Analyzers. The potential explanation for the absence of supporting evidence is that Inside-Out IS resources might not be more deployed by Defenders than by Prospectors and Analyzers, as what is expected in the beginning of this study. The result indicates that defenders are also found to be more prone to possess Spanning IS resources. It looks like that the defenders also assess their business environment, however, they stay much cautious about

it by maintaining a stable and narrow niche in their industry, and they just simply deploy a profile of Spanning IS resources as Analyzers do.

5.2.4 Summary of Discussion

Competitive strategy and resource-based view, two major approaches dominating the field of organizational strategic management, are alternatively called as external and internal perspectives, and perceived as complementary to cover different domains within the context of SWOT analysis. Prospectors are external-oriented, and defenders are internal focused, while analyzers involve a dual-focus of both external-oriented and internal efficiency.

In IT context, Outside-In IS resources are externally oriented, and Inside-Out IS resources are deployed from inside the firm, while Spanning IS resources involve both internal and external analysis.

Therefore it is understandable to find the association between strategy types and profiles of IS resources. Prospectors are more likely to possess Outside-In IS resources to achieve differentiation and analyzers are more likely to possess Spanning IS resources to support their business goals. Although defenders fail to be more likely to possess Inside-Out IS resources to gain competitive advantage of low cost as expected, they seem also scan their business environment, but stay much cautious and simply deploy Spanning IS resources as Analyzers do.

6. Conclusion

6.1 Summary of Results

In summary, the first two hypotheses are supported, while the third hypothesis is not supported. There is a linkage between strategic types and IS resource types. Prospectors are more prone to possess Outside-In IS resources than Analyzers and Defenders, while Analyzers and Defenders are more prone to possess Spanning IS resources than Prospectors. This relationship can be explained by differences both in the strategic activities and in IS resource profiles. Prospectors stress innovation by developing new products and creating new markets, which are their major competence and where they exert their most effort. An Outside-In IS resource profile fully supports a prospector's activities by providing a better market responsiveness and managing external relationships, so a prospector can place an emphasis on anticipating market requirements, creating durable customer relationships, and understanding competitors. Analyzers show an intermediate position since they have characteristics of both prospectors and defenders. The specialization part of their strategy requires them to have Spanning IS resources to manage IS/business partnerships and to conduct IS planning and change management, integrating their Inside-Out and Outside-In resources. However, there is no evidence to support that defenders have Inside-Out resources. Instead, defenders are found to also have Spanning IS resources as Analyzers.

6.2 Implications

6.2.1 Theoretical Implications

This research demonstrates how different type of Wade and Hulland's (2004) IS resource typology is associated with different type of strategies of Miles and Snow's (1978) typology. Prospectors are more prone to possess Outside-In IS resources than analyzers and defenders, while analyzers and defenders are more prone to possess Spanning IS resources than prospectors.

This study also confirms that IS resource of an organization is aligned with its business strategies, for prospectors and analyzers, consisting with the Strategic Alignment Model proposed by Henderson and Venkatraman (1993).

6.2.2 Practical Implications

This study also has implications for practitioners in a few perspectives: (1) The results indicate that prospectors should deploy Outside-In IS resources, while analyzers should deploy Spanning IS resources. (2) IS should be aligned with business strategy, therefore, the role of IS should be viewed as different resources in supporting different business strategies.

6.3 Limitations and Future Research Avenues

This current study has some limitations: (1) The number of participants in the card sorting method is somewhat small, which might have some effect on the results in this research. A card sorting method with more participants would improve the research results. (2) Measurement items for IS resource in this study are adopted from those developed for technological deployment in Croteau and Bergeron (2001). Although the research results reveal their usefulness, a set of measurement items should be developed specifically to test the construct of IS resource profile in a further study. (3) Secondary dataset is collected among Canadian organizations. Generalization of research results beyond this group might be in question.

For future research, since there is no evidence found to support Hypothesis 3, more careful review and appropriate modification of this hypothesis should be done in further study. Another future consideration for research may include the examination of the relationship between organizational performance and the alignment between IS resource type and business strategy type in an organization, which is not addressed in this current study. Finally, factors which influence the alignment between IS resource type and business strategy type in organizations should be fully investigated in future research.

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Appendix

Card Sorting Results for 53 measurement items of IS Resource

Results	Item #	Voting for Outside-In	Voting for Spanning	Voting for Inside-Out	Voting for Not Sure
Outside-In	1	6	1	2	0
Outside-In	7	7	1	1	0
Outside-In	25	5	1	3	0
Outside-In	33	5	1	3	0
Outside-In	47	5	1	3	0
Spanning	2	0	9	0	0
Spanning	3	0	9	0	0
Spanning	11	0	6	3	0
Spanning	12	1	7	7	0
Spanning	17	2	5	2	0
Spanning	18	0	8	1	0
Spanning	19	0	8	1	0
Spanning	24	0	5	4	0
Spanning	27	3	5	1	0
Spanning	28	0	7	2	0
Spanning	35	0	6	3	0
Spanning	36	0	6	3	0
Spanning	39	0	5	4	0
Spanning	41	1	5	3	0
Spanning	42	0	5	4	0
Spanning	49	0	9	0	0
Inside-Out	4	0	2	7	0
Inside-Out	5	0	1	8	0
Inside-Out	6	0	4	5	0
Inside-Out	8	0	1	8	0
Inside-Out	9	0	1	8	0
Inside-Out	14	0	1	8	0
Inside-Out	15	0	3	6	0
Inside-Out	21	0	3	6	0
Inside-Out	22	1	3	5	0
Inside-Out	23	0	3	6	0
Inside-Out	26	1	1	7	0
Inside-Out	31	1	1	7	0
Inside-Out	32	3	1	5	0
Inside-Out	37	0	2	7	0
Inside-Out	43	1	1	7	0
Inside-Out	44	3	0	6	0
Inside-Out	46	0	0	9	0
Inside-Out	48	0	1	8	0

Inside-Out	50	1	0	8	0
Inside-Out	52	2	0	7	0
Withdrawn	10	0	1	7	1
Withdrawn	13	1	5	2	1
Withdrawn	16	0	5	3	1
Withdrawn	20	2	4	2	1
Withdrawn	29	0	2	5	2
Withdrawn	30	0	2	5	2
Withdrawn	34	0	3	5	1
Withdrawn	38	0	5	3	1
Withdrawn	40	1	5	2	1
Withdrawn	45	1	4	3	1
Withdrawn	51	2	2	4	1
Withdrawn	53	1	4	3	1