FLEXIBILITY AND STRATEGIC ALIGNMENT OF ENTERPRISE RESOURCE PLANNING SYSTEMS WITH BUSINESS STRATEGIES: AN EMPIRICAL STUDY

by

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Abstract

This thesis examines relationships between strategic alignment, performance, and strategic Enterprise Resource Planning (ERP) flexibility. We have used different strategy perspectives to form our strategic alignment construct and chosen several significant variables of these constructs based on the literature. The alignment measurement methods were moderation and profile deviation, and several financial values have been used to form the performance construct. Using empirical data, we have showed that enterprise systems' alignment with the business strategy can explain the change in their performance. Moreover, strategic flexibility of an enterprise system such as ERP has an additional positive effect on business performance, but it is mediated by the alignment of enterprise systems and business strategies. From a theoretical perspective, we have explained prior conflicting conceptualizations and empirical findings on strategic flexibility's role by incorporating its indirect effects on business performance. In addition, we have offered a multi-dimensional measurement instrument for ERP alignment to practitioners specifically designed for the alignment of enterprise systems.

Preface

A version of this dissertation has been published and presented at a conference.

Taskin, N., and Verville, J. "An Exploratory Study on Strategic Alignment of Enterprise Systems and Business Strategies, Performance, and Flexibility" In Proceedings of the 23rd ICESAL 2010, Rhodes Island, Greece.

I conducted the design, writing, and analysis of the manuscript. I have received the unlimited support and feedback from Dr. Jacques Verville during this thesis and for the preparation of manuscript. Although this dissertation examines alignment from several perspectives, in the conference paper, our perspective was based on the initial findings with a limited sample size and on general impacts of alignment on performance.

A Certificate of Approval from the University of British Columbia Okanagan Research Services, Behavioral Research Ethics Board has been received for the use of human subjects for collection of data through questionnaire survey with the UBC BREB number: H09-01133. The approval date of the certificate is May 15, 2009 with the principal investigator Dr. Jacques Verville.

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Dedication

I dedicate this work to my family.

1 Chapter: Introduction

In a context of continuous change and intense competition, businesses either adapt to new conditions or fail. To meet the new requirements of the increasingly dynamic environment of business, companies usually seek to expand their market share, reduce their consumption of resources, and improve the quality and efficiency of their products and customer service (Umble, Haft, & Umble, 2003). In a changing competitive environment, organizations need to improve their business practices and procedures as well as their outputs if they are to remain competitive (Umble et al. 2003).

Information Systems (IS) or Enterprise Systems (ES) technology has provided the opportunity for organizations to improve the way they do business. When ES was first introduced, businesses used it to automate information-based processes. Later, they began to use ES to enhance management efficiency. Most recently, businesses have used ES to improve competitive advantage (Ward & Peppard, 2002). Organizations tend to adopt systems that will allow them to gain a competitive advantage over other companies and many have found ES to be such a system.

In addition, many organizations are seeking ES systems to help them collaborate with other organizations. Current developments and trends in business, market pressure, and technological developments have all pushed organizations to improve their business practices and collaborate more; this collaboration sometimes even takes the form of mergers and acquisitions (Stefanou, 2001). Collaboration requires organizations to integrate their systems so they can better share resources and information with customers, suppliers, and distributors (Umble et al. 2003). While Enterprise Systems (ES) have been developed to address these needs and accomplish these goals, Enterprise Resource Planning (ERP) systems are a further development; ERP systems are designed to integrate business functions, improve the accuracy of information available to collaborating organizations, and improve decision making.

ERP systems enable business to integrate processes and functions by providing access to real-time data across different departments and units. They promise reduced resource

consumption; more accurate and efficient processes; and improved customer satisfaction, resource allocation, flexibility, information flow, and business performance (Hsu & Chen, 2004; Poston & Grabski, 2000). Several researchers state that ES are crucial for a competitive advantage (Das, Zahra, & Warkentin, 1991; Porter, 1987). Organizations that have adopted ERP systems cite a desire to improve infrastructure (e.g., by developing a common platform), capability (e.g., process improvement and data visibility), and performance (e.g., through advanced cost reduction, strategic decision making, and customer responsiveness) (Ross & Vitale, 2000).

ERP systems are different from traditional software because of their structure. Traditional software is usually relatively easy to choose and install, and users can begin gaining its benefits in a very short period of time. This is not the case for ERP systems. Research indicates just adopting or installing a system does not guarantee users will benefit from its capabilities or gain a competitive advantage (Muscatello, Small, & Chen, 2003). Successful ERP implementations have delivered the promised benefits, but successful implementations of ERP are very rare. Most ERP projects either fail or they conflict with organizations' strategic objectives (Stefanou, 2001). ERP systems may require several changes in business practices or even in an organization's overall strategy. ERP projects are more successful when managers understand their strategic importance and give high priority to alignment. According to Henderson & Venkatraman (1992), one of the main differences between traditional ES and ERP is the success of ERP depends on a high degree of strategic fit and functional integration. In other words, strategic alignment is a requirement for ERP systems (Esteves & Pastor, 1999; Gibson, Holland, & Light, 1999). Henderson and Venkatraman (1992) state that one of the main differences between traditional ES and ERP is the fact that success of ERP depends on a high degree of strategic fit and functional integration.

Researchers and practitioners have recognized the importance of alignment. During the last decade, managers seeking to add value to their business and improve its performance have made alignment one of their organization's top priorities (Chan & Reich, 2007). Meanwhile, a variety of scholars have stated businesses need to align their strategies and processes if they are to fully benefit from ERP systems (Al-Mudimigh, Zairi, & Al-Mashari, 2001; Gable, Chan, &

Tan, 2001; Holland & Light, 1999; Rao, 2000; Bingi, Sharma, & Godla, 1999; Davenport, 1998, 2000a). When alignment is strategic, it has a direct positive impact on performance and also improves performance indirectly by increasing effectiveness and profitability (Avison, Jones, Powell, & Wilson, 2004; Sabherwal & Chan, 2001; Venkatraman, 2000; Weill & Broadbent, 1998; Luftman, 1996; Porter, 1987). In addition, some scholars suggest that businesses can enhance both the performance and the competitive benefits of ERP by aligning it with organizational goals (Kang, Park, & Yang, 2008; Siswanto & Utomo, 2008).

Literature shows that alignment has a direct and positive impact on performance (Sabherwal & Chan 2001; Chan et al. 1997). However, considering the complexity and broadness of the concepts, there are different aspects that have significant impact on both constructs. One of these significant aspects is the flexibility of ES.

Duncan (1995) defines flexibility as "the ability of a resource to be used for more than one end product" (p: 42). Flexibility of ES enhances organizations ability to respond to the needs and changes in practices and strategies (Duncan, 1995; Clemons & Row, 1991). In a dynamic environment, such as today's business world, flexibility is critical for the success and performance of organizations.

Although flexibility has been defined from different perspectives, even under business we examine flexibility from a strategic point of view under ERP concept. Therefore, in this study, flexibility has been called strategic ERP flexibility and addresses the capabilities of an organization to address the needs of a dynamic business environment through effective and supportive use of information systems. This type of strategic flexibility helps organizations generate innovative solutions, introduce new products or services when realizing a chance (Carignani & Seifert, 2000), closely observe competitors, identify and evaluate new business opportunities, accommodate efficient changes based on the business requirements and give learning opportunity (Tian et al. 2009; Bowman & Hurry, 1993).

The complex nature of the alignment and performance connection requires deeper examination because such concepts do not usually exhibit a simple independent-dependent

variable relationship. Considering the fact that ERP is a strategic enterprise system encompassing information technology or systems, flexibility of its nature from the strategic point of view would have an impact on alignment.

Researchers need to focus on lower-level (or more granule) models/frameworks about any type of ES alignment rather than focusing on a generic model in the dynamic, global, and competitive business environment (Loukis, Sapounas, & Aivalis, 2010). There is also a need for examining the "different types of strategic alignment of enterprise systems to various dimensions of business performance" (Loukis et al. 2010, p.50).

This study examines alignment between business strategies and Enterprise Systems[1], and their relationship with the strategic ERP flexibility rather than focusing on whole ES. This study is a systematic extension of previous works of Venkatraman (1989), Chan (1992), Chan, Huff, Barclay, & Copeland (1997), Sabherwal & Chan (2001) and comprises four key objectives: (1) develop and validate an instrument to measure business strategy, ERP strategy, strategic fit between ERP strategy, business strategy and business performance, and see the relationships between these as well as the effects of enablers (i.e., strategic, organizational, and technical) to this relationship; (2) extend the strategic alignment concept by applying the combination of Miles and Snow and Porter's typologies that will be mapped to strategy attributes as part of strategy; (3) identify the impact of strategic ERP flexibility on alignment of business strategies and ES as well as on business performance; and (4) finally examine two alternative perspectives of fit/alignment: (i) fit as moderation; and (ii) fit as profile deviation (Venkatraman, 1989).

When they are conducting ES planning, organizations need to consider the ERP strategy that will support and fit to their organizations' strategic orientation. This study with its instrument will provide the quantification for evaluation of ERP strategy and ERP strategic fit. While organizations can benefit from the guidance of this instrument for their organization regarding their ES planning efforts, they can also enhance their competitiveness to assess their business and ERP strategies (Chan, 1992).

[1] This study focuses on Enterprise Resource Planning (ERP) systems which is a specific Enterprise Systems (ES). IS and ES are used interchangeably in this study. ES is enterprise wide information systems and refers to an umbrella term for several systems such as ERP, SCM, CRM, etc.

This thesis is organized as follows: the first section analyzes the alignment, strategic ERP flexibility, and performance literature as well as the theoretical model; in the second section the methodology mentioning the design of the study is followed by the results of our study. In the last section, the paper is finalized with a discussion and conclusion section. Figure 1 reveals the conceptual map of the study.

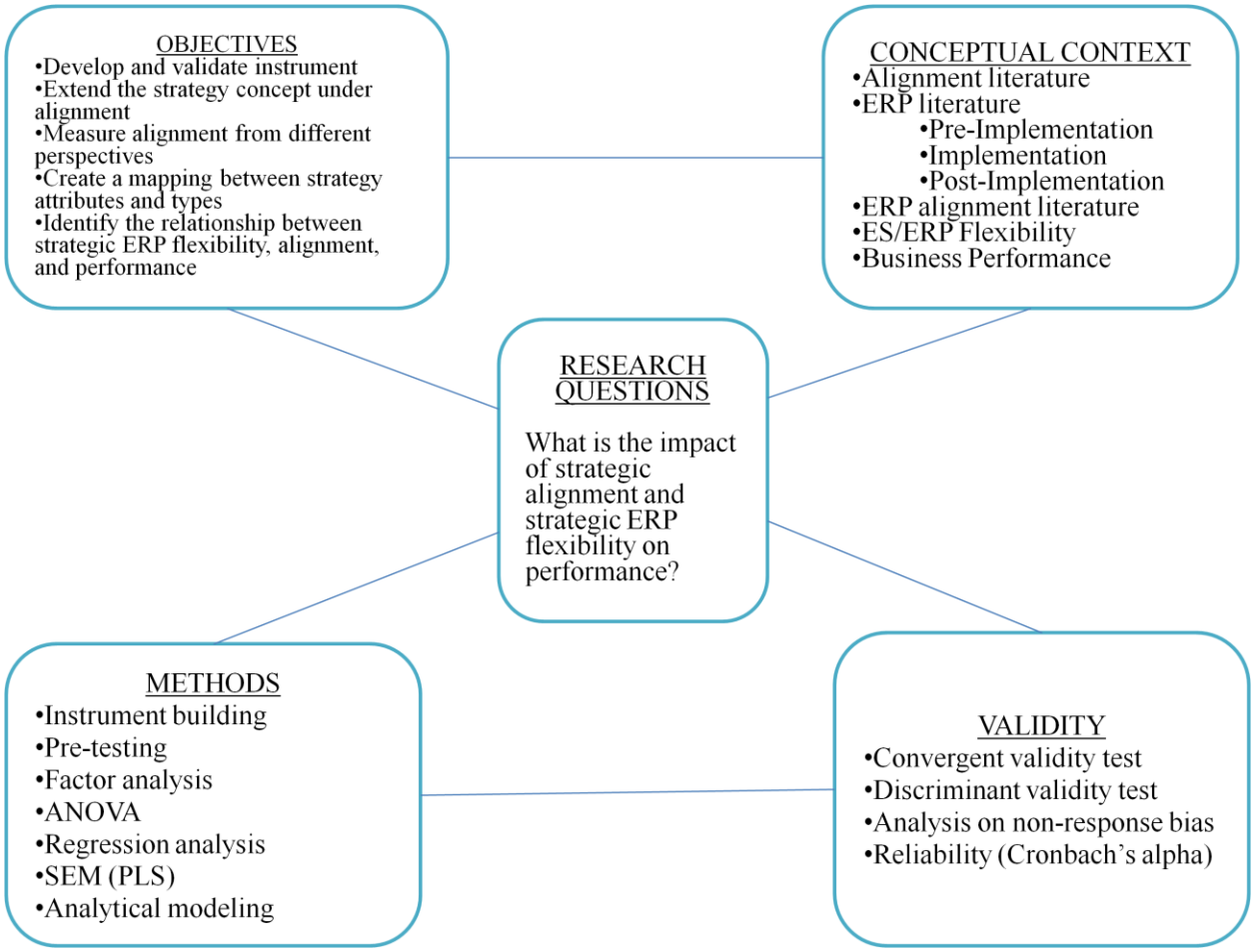

Figure 1 Conceptual Map of the Study

2 Chapter: Prior Research

Although there are several studies pertaining to alignment, there is no agreed definition of alignment. Based on previous definitions, for this study, we define alignment as a continuous and dynamic process that requires appropriate and supportive use of ERP with business strategies and objectives in order to contribute or enhance the business performance over time. In addition, alignment can also relate to the synergy, fit, and integration between business and ES strategies (Chung & Lewis, 2003; Hirschheim & Sabherwal, 2001). The objective of alignment is to support the business pertaining to its plans, missions, decisions, capabilities, and actions (Chan, 2002).

The literature has distinguished several types of alignment as well as several perspectives pertaining to alignment. Based on the literature, there are six types of alignment at the business unit level that involves business and ES components: (i) Strategic Alignment; (ii) Business Alignment; (iii) Structural Alignment; (iv) Information Systems Alignment; (v) Cross-Dimensional Alignment; and (vi) Alignment Mechanisms (Sabherwal et al. 2001). While the literature provides several examples for different types of alignment, the majority of the research has shown that alignment should be strategic in order to provide the highest benefits, such as improving competitive advantage and enhancing performance (Chan & Reich, 2007; Levy, 2000).

The benefits of aligning business and generic ES strategies have been recognized by several researchers and practitioners (Croteau & Bergeron, 2001; Sabherwal & Chan, 2001; Chan et al. 1997; Henderson & Venkatraman, 1993). Some benefits of aligning ES to business strategies include (1) increasing organizations' return on ES investment; (2) improving companies' competitiveness; (3) enhancing flexibility (Avison et al. 2004); and (4) profitability of organizations (Papp, 2001; Galliers, 1991). With the alignment, organizations can have the traditional benefits of IT/IS/ES in terms of having an organization's operations accepted by executives (Huang & Hu, 2007) as well as obtaining top management support (Lederer & Mendelow, 1989). Studies also show that alignment is one of the critical issues for economic performance (Ciborra, 1997). Studies of Chan (Chan & Reich, 2007; Chan, Sabherwal, & Thatcher, 2006) also support the notion that alignment improves the performance by allowing

organizations to use ES more strategically. In addition, Papp (1999) states alignment is a key area managers focus on in order to improve financial performance. In a more current study, Ladley (2010) states "business-visible elements" of alignment include improved and more sophisticated relationship with customers and related third parties, improved workflow, content management and data quality, reengineered business processes appropriate to business goals, etc. (p.216).

Current trends in alignment research encourage granularity as well as enablers and antecedents of alignment. While the majority of earlier research on alignment was on the whole ES strategy or structure, several researchers have been encouraging increasing the specific components (granularity) on many aspects. For example, Hong & Kim (2002) identify the contingency variables of ES that researchers have tended to examine. These variables include strategy, structure, size, environment, technology, task, and individual characteristics. Studies focusing on each of these variables, separately and in more detail, would bring useful information, at least as much as examining all variables together. Considering the fact alignment is between business and ES, our focus will be on technology.

The motivations of this stream of research come basically from the growth and broadness of the technology field. The variety of technology products and systems and the integration of the systems, components, data, and processes into a unified system have led to development of new systems that are strategic to organizations. These new systems have been formed into new structures (i.e., ERP, SCM, and CRM) that emphasize their own logic to organizations' strategy that traditional ES models may not capture. Therefore, while examining alignment, focusing on a specific technology rather than trying to cover all IS or ES would be more reliable.

Researchers also agree that increasing the granularity of research would bring more benefits to alignment research (Chan & Reich, 2007; Farrell, 2003). Palmer & Markus (2000) and Chan and Reich (2007) also state that "one-size fits all" type research is not an appropriate method for alignment. Chan (Chan & Reich, 2007; Chan et al. 2006) states that alignment should be examined in more detail than it has been done today. Therefore, they signal towards a more specific research related to alignment. In addition Chan (2002) states that: "Due to the complex

and daunting nature of overall business, IS [ES] alignment, perhaps successful alignment, is more likely by emphasizing the management of specific components of alignment, rather than aiming for seemingly unreachable target of multi-faceted, overall alignment. This is not to diminish the importance of maintaining a holistic view of alignment. It merely suggests that focusing on how individual components contribute to alignment may be more feasible, and yield better results, than tackling all the alignment challenges of the entire IS [ES] organization at once" (p.99).

Granularity can be based on many perspectives such as industry effect on alignment, effects of company size, country effect as well as specific technology effects on alignment. For example, Chan and Reich (2007) support Farrell's (2003) study and suggest researchers should examine industry differences and effects of industry type on alignment rather than covering all industry types at once. In addition, in terms of granularity, Street (2006) and Chan and Reich (2007) recommend focusing on research based on specific firm sizes. In that sense, researchers also encourage examining specific technologies instead of whole ES while examining alignment. For example, Kang et al. (2008) use some components of Strategic Alignment Model (SAM) and measure alignment between organizational infrastructure and ES infrastructure by focusing on a specific technology, ERP, where ERP alignment is defined as a state where the business activities of departments are changed to meet the requirement of the ERP system in a way that there will be a harmony and internal coordination with overall organizational objectives. On the other hand, Wehmeyer (2005) apply strategic alignment model of Henderson and Venkatraman to distinguish database marketing and CRM. In this conceptual study the authors examine alignment from not only a specific technology perspective like CRM but also from a specific business unit perspective like marketing. Raymond & Bergeron (2008) examined the alignment between e-business capabilities such as e-communication, e-commerce, e-intelligence, and e-collaboration of SMEs in the manufacturing sector with business strategy through Miles & Snow (1978) typology. In a recent study, Ravishankar, Pan, & Leidner (2011) state the importance of examining a specific technology rather than the generic enterprise systems and focus on alignment of knowledge management systems and influence of subcultures (i.e., practices, interpretation, and various beliefs, etc.) on alignment at corporate and business unit levels.

Alignment has been studied from several perspectives by many researchers: duration (long term vs. short term (Reich & Benbasat, 2000)), the ways to achieve alignment, the methods to measure alignment, result of alignment (outcome vs. process or static vs. moving target), and level (firm level vs. process level (Tallon, 2008)). In addition, alignment studies can be grouped under three categories (Chan, Huff, & Copeland, 1998; Chan et al. 1997; Hambrick, 1980): textual description, deductive typologies, and empirical measurements. While textual descriptions are in the form of case studies, deductive typologies focus on classification of aspects, and empirical studies use measurement through scales (Chan et al. 1998).

Sabherwal & Chan (2001) examine the evolvement of alignment over time. The authors state that organizations go through some level of transformation. These transformations may be either revolutionary or evolutionary. While evolutionary changes refer to modifications, revolutionary changes refer to a major change, possibly into another business strategy. The revolutions are triggered by one or more of "environmental shifts, sustained low performance, influential outsiders, new leadership, and perception transformation" (p.194).

Zajac & Shortell (1989) state generic strategies should be expanded in order to match the changes in conditions such as environments, industry, etc. The authors also state that change in terms of strategy depends on two aspects: willingness to change and the ability to change. The main assumptions in attempting to change the strategy are: i) belief in doing the right move; and ii) minimal cost of changing (Zajac & Shortell, 1989). Zajac and Shortell (1988) find that organizations usually change their strategy or shift from one strategy type to another, in order to adapt the shifts in environment; previous experience of change have a strong impact on the attitude towards the new changes; this change of strategy may not always bring advantages (i.e. performance) to the organizations.

Ward & Peppard (2002) state ES strategy that enhances the business value should be applications focused. Parallel to these, we will focus on ERP, an ES, instead of focusing alignment with whole ES or IS. Following a generic perspective, which is covering whole ES on alignment may have several disadvantages. For example, Avison et al. (2004) argue that following a generic strategy may cause organizations to lose their flexibility. According to Klein

& Calderwood (1991), the more generic the research, the wider range of applicability, the more multi-purpose usage, the more common language and metric would apply. However, the assumptions (goals, choices, independence of utilities, and relationship between utilities) should be crucial while conducting a generic research. Generic ES models may have problematic assumptions that will not fit to specific technologies leading to less appropriateness, reduced sensitivity, abstractness or mismatch between the goals of specific technologies and the organization's elements. On the other hand, the more specific research would capture more details in terms of business processes (i.e., importance), flows, structure, etc. (Andersen & Fagerhaud, 2001).

In a more recent study, Loukis et al. (2010) states that "further research is required for the development of 'lower-level' and more practically applicable models/frameworks, which offer a more specific and complete guidance for directing and assessing enterprise systems strategic alignment, and also are adapted to the technological advances and the new globalized and highly competitive business environment" (p.49). Loukis et al. (2010) states that "further research is required in order to understand better the contribution of different types of strategic alignment of enterprise systems to various dimensions of business performance, in various types and sizes of enterprises and in various sectoral, national and cultural contexts, based on objective business performance measures… Also it is necessary to investigate the dependence of the contribution of enterprise systems strategic alignment to business performance on various external and internal environment factors (e.g. business strategy, competition, etc.) and to identify its main moderators" (p.50). Therefore, examining alignment from a specific technology perspective rather than an overall ES approach can provide more reliable results.

2.1 Business Strategies and ES Strategies

The primary focus of alignment has been business and ES as a whole. Researchers have examined their components such as structure and strategy, as well as combinations and relationships of these components. For instance; Chan et al. (1997) examine the alignment between business and ES strategies, called strategic alignment, Ein-Dor & Segev (1982) examine the structural relationship of ES and business, called structural alignment, Sabherwal et al. (2001) examine alignment between ES strategy and business structure, or ES structure and

business strategy, called cross-dimensional alignment, Broadbent & Weill (1993) examine alignment between ES strategy and ES structure, etc. In short, several alignment models have assessed alignment with different constructs, but by using two main domains: business and ERP, which are also examined from both strategy and structure perspectives.

2.1.1 Strategy

Strategy has been defined by Chandler (1962) as “the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and allocation of resources necessary for carrying out these goals” (p.13). Mintzberg (1978) distinguishes strategy as having both sides: intended strategy and realized strategy. The author defines strategy "strategies as intended, a priori guidelines as well as strategies as evolved, a posteriori consistencies in decisional behavior" (p.935). Hambrick (1983a) defines strategy as "a pattern in a stream of decisions (past or intended) that (a) guides the organization's ongoing alignment with its environment; and (b) shapes internal policies and procedures" (p.5). According to Hambrick (1983a) strategy has a crucial impact on an organization's alignment, policies, competencies, structure, and processes.

Strategy has mainly been examined from two separate perspectives in strategic management literature: corporate strategy and business unit strategy. According to Porter (1987) "a diversified company has two levels of strategy: business unit (or competitive) strategy and corporate (or companywide) strategy. Competitive strategy concerns how to create competitive advantage in each of the businesses in which a company competes. Corporate strategy concerns two different questions: what business the corporation should be in and how the corporate office should manage the array of business units" (p.43). Porter (1987) also identifies four concepts of corporate strategy such as portfolio management, restructuring, transferring skills, and sharing activities.

Strategy is related to long-term survival of organizations. Since the business is a dynamic environment, organizations and strategies need to evolve to adapt these changes (Tang & Walters, 2010).

2.1.2 Business Strategy

One of the building blocks of alignment is business strategy. Business strategy deals with the mission, strategy, and tactics of the organization, and identifies the resources and their allocation to achieve the goals. Hambrick (1980) and Chan et al. (1997) discuss four approaches in research for operationalizing business strategy. These strategies include (1) textual descriptions (mainly for theory building); (2) measurement of parts (mainly for theory building and testing as well as improving measurement reliability); (3) multivariate measurement (measure the theoretical dimensions of strategy); and (4) typologies. The forces that shape business strategy can be categorized as internal and external forces (Ward & Peppard, 2002; Treacy & Wiersma, 1992). While current resources, demands from stakeholders, and competencies drive the strategy internally; economic environment, market conditions, and rivals drive the strategy externally (Ward & Peppard, 2002; Treacy & Wiersma, 1992).

While analyzing the business strategy, one should consider several requirements. These requirements include identifying the newly emerged strategy components, analyzing the current strategy, and bringing the ES requirements into a strategic plan (Ward & Peppard, 2002).

2.1.3 ES Strategy

ES strategy, as well as business strategy, has been studied by several researchers. Therefore there are several definitions of both concepts. In a variety of studies, ES strategy has been defined as merely a supportive plan developed by ES to contribute to the organizational strategy (Hirschheim & Sabherwal, 2001). ES strategy has been examined from several perspectives such as role, process, sourcing, and infrastructure of IS. Henderson & Venkatraman (1992) define ES strategy as follows: "...we conceptualize IT [ES] strategy in terms of three dimensions: (1) information technology scope - the steps and range of IT [ES] systems and capabilities (e.g., electronic imaging systems, local and wide-area networks, expert systems, robotics) potentially available to the organization; (2) systemic competencies - those distinctive attributes of IT [ES] competencies (e.g., higher system reliability, interconnectivity, flexibility) that contribute positively to the creation of new business strategies or better support existing business strategy; and (3) IT [ES] governance - choice of structural mechanisms (e.g., joint ventures, long-term contract, equity partnerships, joint R&D) to obtain the required IT [ES]

capabilities" (p.100). We focus on the role of ES strategy and define ES strategy as a formation, plan of action that enhances the performance through synergy with business strategy.

ES strategy is considered a non-separable part of corporate strategy by some researchers because of its structure (Smaczny, 2001). Generally speaking, organizations include several components such as production, accounting, finance, etc. Each of these components usually has a technology system individually. According to Edwards (2001) the compatibility of these technologies is critical to the success of overall corporate goals. In addition, an effective ES strategy should address unit goals, type of technology, and match between the technology and business needs (Edwards, 2001).

Researchers state further examination of topics such as ES and ERP will bring more benefits to academia (Farrell, 2003; Chan & Reich, 2007) and encourage researchers to go beyond "one-size fits all" type research (Palmer & Markus, 2000; Chan & Reich, 2007). Therefore, in this research, we have examined the strategy concept from a more specific perspective and focused on ERP strategy rather than generic ES strategy. However, since ERP strategies can be a subset of ES strategy, many aspects of ES strategy can be applied to ERP strategy. The differences are based on the definition of ERP strategy. In this study, ERP strategy refers to strategic and supportive use of ERP systems to help the organization to gain or improve operational excellence, customer and supplier intimacy, competitive advantage, product/service development, improved decision making and meet the strategic objectives of business. Based on Luftman's (2004) argument, we can say the main goal of ERP strategy is to make sure the decisions made by ES management either enables or drives the business strategy.

2.1.4 Benefits of ES Strategy

ES strategy is critical to the organization for several reasons. For example, ES strategy allows organizations to determine strategic applications, gain competitive advantage, improve technology's contribution, provide better communication, improve processes, increase efficiency and effectiveness of resources, estimate ES requirements, etc. (Ward & Peppard, 2002).

ES strategy is expected to enhance the value of business. When Ward & Peppard (2002) define the components of ES strategy, they state ES strategy should be based on business and support the overall business strategy while addressing the demand and receiving directions from business.

Positive effects of having a strategy for enterprise wide information systems have been discussed in literature Ward & Peppard (2002) explained several reasons for the need of an ES strategy. Some of the consequences for the lack of an ES strategy include: (a) Decision and project evaluations would be made based on only financial indicators; (b) Integrating systems and units would be difficult or impossible; (c) Resource allocation would be more problematic; (d) Adapting to dynamic business environment and technology would be more difficult; (e) Increased misunderstanding between users and ES department, etc. (Ward & Peppard, 2002).

2.1.5 Developing an ES Strategy

Organizations can adopt or develop their own ES strategy. According to Ward & Peppard (2002) developing an ES strategy is not easy and in order to develop an ES strategy one needs to think strategically and plan for long-term effectiveness. The main reasons to adopt an ES strategy include (1) enhancing flexibility for future technology; (2) having ES aligned with business strategies; (3) building competitive advantage; and (4) better resources (Ward & Peppard, 2002).

Furthermore, the strategic use and importance of ES has followed an evolutionary path. Ward & Peppard (2002) examine the evolution of strategic use in five stages.

1. Initially, organizations had IT departments developing projects separately based on the needs. In this stage ES had a limited role, and IT departments needed to convince the management in favor of the ES and its benefits to their business.
2. In the second stage, management should have perceived the importance and benefits of ES and convinced to adopt key operational applications.
3. In the third stage, the focus should have been on the planning, and implementation of the applications. The importance of having support should have been also recognized in this stage.

4. In stage four, management may encourage for innovation by supporting ideas that have strategic potential.
5. The final stage is the one where competitive impact of ES has been recognized and the alignment of ES strategies and business strategies is ensured (Ward & Peppard, 2002a).

While ES strategy had been examined as a supporting idea to the ES function such as cost leadership or differentiation, or in some it has been examined as a structure having several process and infrastructure dimensions by several researchers, Hirschheim & Sabherwal (2001) examine ES strategy from a dimensional perspective. The authors examined ES strategy as having three dimensions: ES role, ES sourcing, and ES structure. The components of ES role include efficiency, opportunistic, and comprehensive. ES source arrangement dimension was examined by the components such as outsourcing, selective sourcing, and in-sourcing while ES structure dimension can have three possibilities as centralized, shared, and decentralized (Hirschheim & Sabherwal, 2001).

2.1.6 Dimensions of ES Strategy

Although ES strategy, like business strategy, can be examined from two levels as intended strategy and realized strategy, many researchers have focused only on intended strategy (Chan et al. 1997). A number of studies also mainly focus on strategic planning (Gibson, 1996; Premkumar & King, 1994; Keen, 1991) by focusing on strategy statements and documents. Realized strategy has not been a focus for many researchers. In spite of this stream of research, whether it is realized or intended, measurement of ES strategy has not attracted much attention from scholars (Chan et al. 1998).

Luftman, Lewis, & Oldach (1993) state ES strategies should be aligned with business strategies in order to be able to utilize ES in an effective and efficient way. (Kearns & Lederer (2000) and Benbya & McKelvey (2006) state the stronger the alignment between ES and organizational strategies and objectives, the better performance and outcomes organizations have.

2.1.7 Three Blocks of Business and ES Strategies

Scope, competencies, and governance are three blocks of strategy and these blocks have been examined as part of both business, and ES strategies by Henderson, Venkatraman, & Oldach (1996). Scope of business strategy deals with the products and services and positioning of the organization. Competencies deal with how to differentiate and choosing the differentiation strategy (Maes, 1999). Business governance deals with making decisions as regards to using the resources, mergers, partnerships, etc. On the other hand, Maes (1999) summarized the ES strategy of Henderson et al. (1996) by using these three building blocks. The author states that ES scope of strategy deals with both external and internal strategies and allows an organization to position itself based on these external and internal ES strategies. ES competency deals with differentiating based on the use of knowledge. Finally, ES governance deals with strategic buying or making information decision and strategic partnerships (Maes, 1999).

2.1.8 IS, IT, ES, and ERP

While examining the business strategy and ES strategy, researchers need to be aware of the distinction between content and process (Sabherwal & Chan, 2001). Content addresses the question of "What strategy is the organization is pursuing?" and process addresses the question of "How does the organization develop its strategy?" (Sabherwal & Chan, 2001, p.12). Since this study's objective is not to examine how to reach alignment or how to develop a strategy, we will be focusing on the content part of the distinction. As Sabherwal & Chan (2001) stated, three strategies should be clarified about content: Information Systems strategy, Information Technology strategy, and Information Management strategy. Although these terms have been used interchangeably, there are slight differences among them. In addition to the fact there is a slight difference between IS and IT, the familiarity of organizations with IS is much older than their familiarity with IT (Ward & Peppard, 2002).

The concepts of IS and IT have changed over years and these concepts are not the same as they were ten years ago or more. The role of IS or IT has shifted from being a simple support tool for back-office operations in organizations (Tang & Walters, 2010) to a strategic component that integrates functional areas within organizations. As Tang & Walters (2010) states, the technology “has shifted from efficiency to effectiveness, and in the Internet era, to value

creation. On one hand, IT is playing a more active and important role in strategic management. On the other hand, strategic management concerns have influenced the development of IS" (p. 30).

Mortimer (2007) defines IS strategy as "the study of the methods and means by which information is processed and conveyed" (p.108). It "focuses on systems or business applications of IT, being concerned primarily with aligning them with business needs and using them to derive strategic benefits" (Earl, 1989; Sabherwal & Chan, 2001). The UK Academy of Information Systems define IS as "the means by which people and organizations, utilizing technologies, gather, process, store, use, and disseminate information." The domain of IS include the "study of theories and practices related to the social and technological phenomena, which determine the development, use and effects of information systems in organizations and society" (Ward & Peppard, 2002, p.3; UKAIS, 1999).

On the other hand… "IT refers specifically to technology, essentially hardware, software and telecommunications networks" (Ward & Peppard, 2002, p.3; UKAIS, 1999) and can be defined as "the acquisition, processing, storage, and (delivery and sharing) dissemination of information and other digital content by means of computers and telecommunications" (Mortimer, 2007, p.108; Ward & Peppard, 2002, p.3; UKAIS, 1999) and be "best seen as the technology framework or architecture which drives, shapes and controls the IT infrastructure" (Earl, 1989, p.95). It is concerned with "technology policies, including such aspects as architecture, technical standards, security levels, and risk attitudes" (Sabherwal & Chan, 2001, p.12).

According to Earl (1989) IM strategy "is concerned with the role and structure of IT activities in the organization. It focuses on relationships between the specialists and users; between the centre and divisions or business units. It is concerned with management control for IT" (p.65) and aims at "putting the management into IT" (p.64).

In short, "Whereas the IS strategy is about ‘what’ and the IT strategy about ‘how,’ the IM strategy is about the ‘wherefores’ - which way? Who does it? Where is it located?, etc." (Earl, 1989, p. 65).

The terms Information System and Information Technology have been used interchangeably with other terms as well. Ward and Peppard (2002) state the term Information and Communication Technologies (ICT), which is commonly used in European Union Countries, is the corresponding term for North America’s Information Technology. Loukis et al. (2010) use the term “ICT” instead of IT and the term Enterprise Systems instead of Information Systems. Ward and Peppard use the term Enterprise Systems (ES) instead of Information Systems. ES refers to Enterprise wide Information Systems across several industries. In that sense, ES is used as a generic term for Information Systems with current technology. In other words, ES refers to the Information Systems of 21st century that includes enterprise wide strategic systems ranging from Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM), Supplier Relationship Management (SRM), Advanced Planning and Scheduling (APS), Product Life Cycle Management (PLM), Sales Force Automation (SFA), Call Centre Management (CCM), to Policy Administration (PA). Ward and Peppard (2002) states the main characteristics of these systems "affect a large number of organizational processes and functions, standardizing and integrating information and activities... and all have a significant influence on the overall IS strategy of the organization" (p.542).

Any type of application for IS has four main characteristics: strategic, high potential, key operational, and support (Ward & Peppard, 2002). Usually every application can be categorized under one of these characteristics. However, ERP can be categorized as a combination of these four characteristics rather than a single one (Ward & Peppard, 2002). Therefore, Enterprise Systems, with the most common application of ERP, are different than generic IS or ES.

The main differences between generic IS or ES and a specific system such as ERP are the nature of the system that is "the ambitious intentions, the application complexity and cross-functional scope, the range of different stakeholders involved, and extent of business and

organization changes needed to accommodate the new business models" and the possibility of failing the whole business (Ward & Peppard, 2002, p.544). In this study, unlike previous studies, we will be using a specific system, ERP instead of the generic IT or IS concept and term ES instead of IS or Enterprise Wide Information Systems.

2.2 Overview of Alignment

Alignment has been one of the top three issues and concerns of ES and business executives for more than 20 years (Gutierrez, Orozco, & Serrano, 2009; Symons, 2005). There are several studies in the literature which discuss the benefits of alignment. Although the number of studies examining alignment is extensive, there are still several concepts that are not agreed on regarding alignment. For example, there is little agreement regarding the definition, purpose, benefits, and the ways to achieve alignment (Avison et al. 2004). There are different pseudonyms used by different authors to refer the phenomenon of alignment (Avison et al. 2004; Maes, Rijsenbrij, Truijens, & Goedvolk, 2000). Several terms used by authors include:

- Balance (Henderson & Venkatraman, 1993),
- Coordination (Lederer & Putnam, 1986),
- Integration (King & Teo, 1997; Weill & Broadbent, 1998),
- Linkage (in terms of domains) (Henderson & Venkatraman, 1989; Reich & Benbasat, 1993, 1996),
- Harmony (Luftman et al. 1993),
- Fit (between realized ES and business strategies) (Chan, 1992; Porter, 1996; Venkataramanan, 1989; Venkatraman, 1989),
- Synergy (Sethi, 1988), bridge (Ciborra, 1997a; Ciborra, 1997b), and
- Fusion (Smaczny, 2001).

Chan & Reich (2007) mention terms that are not common such as congruence and co-variation that are equivalent of fit. Although these terms refer to the same phenomenon and try to explain it, Maes et al. (2000) and Avison et al. (2004) argue the amount of different terms is an indication of confusion regarding alignment.

There are several definitions of alignment; however, many of these definitions are vague and not comprehensive (Maes et al. 2000). Luftman, Lewis, & Oldach, (1993) define alignment as "a technique for continuously thinking about how to analyze and derive organizational direction" (p.207) and "applying IT[ES] in an appropriate and timely way and in harmony with business strategies, goals, and needs" (Luftman & Brier, 1999, p.109). Reich & Benbasat (1996) define alignment as “linkage” and as "the degree to which the IT [ES] mission, objectives, and plans support and supported by the business mission, objectives, and plans" (p.56). Maes et al. (2000) define alignment as "the continuous process, involving management and design sub-processes, of consciously and coherently interrelating all components of the business – IT [ES] relationship in order to contribute to the organization’s performance over time" (p.15). In a more recent study, Ladley (2010) defines alignment as “the direct linkage of IAM [ES] efforts to business strategies, and the measurement of information and knowledge projects against anticipated benefits... aligned means that business needs are directly fulfilled by information and content management when called for. Alignment gives us the ability to tie an IM project to a specific business objective, and measure results against that objective" (p.216). Huang & Hu (2007) state that "alignment is more than a passive matching operation of IT [ES] with business activities. It involves active design, management, and execution of the IT [ES] functions in accordance with company's goals and strategies. Alignment is not just a process, but a mindset of how IT [ES] can work for, a basic principle of interaction between IT [ES] and business" (p.174).

2.2.1 Different Views Pertaining to Alignment

Maes et al. (2000) presents an overview of literature regarding different views about alignment. For instance, two of these views are in regards to the continuity of alignment and the focus of alignment. The focus of these different views is primarily related to the perception of alignment as either the strategic fit between business and ES (Chan et al. 1997) or a more comprehensive linkage or integration (Henderson & Thomas, 1992) where the fitting is possible between technology and infrastructure (including processes, skills, and architecture).

The discussions regarding continuity of alignment have focused on whether alignment is a continuous process or just an end state. Benbya & McKelvey (2006) support the view that

alignment is a continuous interaction between both ES and business components. Meanwhile, the authors define alignment as "a continuous coevolutionary process that reconciles top-down 'rational designs' and bottom-up 'emergent processes' of consciously and coherently interrelating all components of the Business/ES relationships in order to contribute to an organization's performance over time" (p.285). Similarly, Hirschheim & Sabherwal (2001) define and discuss alignment based on three arguments: "One, an organization's performance is related to its attaining the appropriate structure and capabilities to execute its strategic decisions. Two, alignment is a two-way street. As organizations enter an era of information superhighways, expanded electronic commerce, and 'virtualness,' executives increasingly realize that in addition to business strategy influencing IT [ES], IT [ES] now influences business strategy. Finally, it is evident that strategic alignment is not an event, but a process of continuous adaptation and change" (p.87). Today's business environment and conditions such as dynamic nature of industries (Kearns & Lederer, 2004), new organizations through mergers, requirements of innovations and emerging technologies (Cegielski, Reithel, & Rebman, 2005), acquisitions (Wijnhoven, Spil, Stegwee, & Fa, 2006) and globalization are some of the reasons why alignment is not a state but a moving target (Ravishankar et al. 2011). In addition, Henderson & H. Venkatraman (1989), Broadbent & Weill (1993), Henderson & Venkatraman (1993), Barclay, Higgins, & Thompson (1995), Chan et al. (1997), Ciborra (1997), (Venkatraman, 2000) argue that alignment is a process rather than being a onetime activity or event unlike Porter & Millar (1985), and Earl (1989) who perceived alignment as an outcome.

Although a more common stream of research supports the idea that alignment is a process rather than being an outcome (Papp, 1999; Henderson & Venkatraman, 1993), another stream of research accepts alignment as an end state. The idea of being a state has brought the concepts of antecedents and outcomes to the discussion. Therefore, several researchers examine antecedents and outcomes of alignment (Chan & Reich, 2007). For example, (Chan & Reich (2007) state that alignment itself has outcomes as well as antecedents. Brown & Magill (1994) as well examined the antecedents of alignment. The authors found corporate vision and strategy, organization's structure, culture, IT's [ES's] role, satisfaction with management of technology and use of it, and locus of control are among the antecedents for alignment. Other antecedents mentioned by Chan & Reich (2007) include shared knowledge, communication, implementation success, relationship

between ES and business planning (Reich & Benbasat, 2000) and size of organization (Chan et al. 2006). Among the hypothesis of Chan et al. (2006), planning sophistication and prior successes are mentioned as antecedents in addition to shared domain knowledge, size of organization, and environmental uncertainty. Several researchers also state the relationship between the ES department and other business units (Feeny, Edwards, & Simpson, 1992) in terms of support, confidence, objective awareness, etc. (Chan & Reich, 2007; Thompson & Ang, 1999) are among the antecedents of alignment (see Table 1). In addition, prior research shows shared understanding between the CIO and top management team (Preston & Karahanna, 2009) and support of the senior executives (Luftman & Brier, 1999) are prerequisites for alignment. Shared domain of knowledge has direct (Reich & Benbasat, 2000) and indirect, through shared understanding impact on strategic alignment (Preston & Karahanna, 2009). Other antecedents of shared understanding include shared domain of knowledge, shared language, and structural systems of knowing (Preston & Karahanna, 2009) that have impact on strategic alignment. On the other hand, research of Preston & Karahanna (2009) shows factors such as "social systems of knowing, representing informal social interactions between the CIO and TMT, and experiential similarity" (p.1) do not have any impact on strategic alignment.

Conversely, although there are many antecedents of alignment distinguished in literature, outcomes do not have that much variety. Outcomes of alignment can be grouped under two categories: (1) organizational performance; and (2) industry performance (Chan & Reich, 2007). In terms of organizational performance, Chan & Reich (2007) state profit of an organization (Chan et al. 1997) and business performance (Sabherwal & Chan, 2001) are enhanced with alignment. Chan & Reich (2007) argue that outcomes of alignment are not limited to organizational factors and even industries are affected by the alignment. The authors mention how an industry can be affected from well-aligned ES and provide the example regarding how Bank of America has succeeded in their Electronic Recording Method of Accounting (ERMA) project and the entire industry has been affected from this success. In addition, alignment behaves as a catalyzer for organizational transformation (Chan & Reich, 2007; Henderson & Venkatraman, 1992) in terms of establishing relationships, value recognition of ES, and practicing the theoretical concepts more efficiently (see Table 1).

Table 1 Selected Antecedents and Outcomes of Alignment

	Items	Authors
Antecedents of Alignment	Corporate vision, corporate strategy, organization's structure, culture, ES' role, satisfaction with management of technology and use of it, locus of control, etc.	Brown & Magill (1994)
	Shared knowledge, communication, implementation success, relationship between ES and business planning, support, confidence, objective awareness	Reich & Benbasat (2000), Chan & Reich (2007)
	Size of organization, planning sophistication, prior successes, environmental uncertainty	Chan et al. (2006)
	Relationship between ES department and other business units	Feeny et al. (1992)
	Support, confidence, objective awareness	Teo & Ang (1999)
Outcomes of Alignment	Organizational performance, Industry performance	Chan & Reich (2007)
	Organizational transform	Henderson & Venkatraman (1992)

2.2.2 Perspectives on Alignment

Discussion regarding alignment has several perspectives. In this subsection, we provide a short review of the literature regarding the studies that examine alignment from different perspectives. The main perspectives discussed are: (a) the direction of alignment, examining whether ES or business should be aligned to the other one (Kearns & Lederer, 2000); (b) dimensions of alignment such as strategic dimension, operational dimension, and individual dimension (Benbya & McKelvey, 2006) or strategic and intellectual, structural, social, and cultural (Chan & Reich, 2007); (c) focus of organization; and (d) levels (organizational and system) of alignment.

2.2.2.1 Direction of Alignment

In alignment literature, business and Enterprise Wide Information Systems have been the main domains of alignment. Researchers focused on the components of each domain in terms of strategy, structure, and even processes. While some researchers argue ES components should be aligned to business components (especially considering the processes level), several researchers argue the opposite and claim business components should be aligned to ES components. In addition several researchers argue that alignment is about ES and business working together in the same direction (Chan & Reich, 2007; Abraham, 2006; Campbell, Kay, & Avison, 2005). Based on the component, its characteristics, and the amount of required change the answer to this

question may change. For example Kearns & Lederer (2000) argue that aligning business strategy based on ES strategy can cause big losses in organizations. Ravarini, Tagliavini, Pigni, & Sciuto (2000) state organizations can align their business processes to ES requirements where they examined ERP. In this study, we perceive alignment as an interaction between business and Enterprise Systems and adherence to a profile, where strategic use of ES requires a support to business strategy and this interaction has an impact on business performance at the end.

2.2.2.2 Dimensional Perspective of Alignment

In alignment literature, several authors examine alignment from different perspectives, dimensions, or levels. For example, Benbya & McKelvey (2006) categorized alignment into three broad groups as strategic dimension, operational dimension, and individual dimension. Strategic dimension focuses on the strategy component and deals with alignment between ES and business strategies. Operational dimension focuses on the structure component and deals with the alignment of business and ES structures. Research dealing with operational dimension of alignment also includes studies, which focuses on responsibilities and deployment of employees, communication among and with executives, and decision making rights as well. On the other hand, individual dimension focuses on infrastructure and mainly deals with alignment of ES infrastructure and end user needs (Benbya & McKelvey, 2006).

According to Chan & Reich (2007) alignment has at least four dimensions: strategic and intellectual, structural, social, and cultural.

1. Strategic dimension refers to the fit between ES strategy and plans with business strategy and plans while intellectual dimension refers to interrelation between ES and business that results in higher quality (Chan & Reich, 2007; Reich & Benbasat, 2000).
2. Structural dimension is related to structures of ES and business. Several issues such as reporting relationships, deployment, decision-making rights, centralization (centralized, decentralized, federal, business unit, business venture (Chan & Reich, 2007; Chan, 2002; Earl, 1989), or hybrid (Chan & Reich, 2007; Brown & Magill, 1994) are among the components of this dimension. These authors also mentioned informal type of structure that has impact on performance. They define informal structure as "relationship-based structures that transcend the formal division of labor and coordination of tasks" (p: 5).

3. Social dimension refers to the executives' level of commitment to the organization's mission, and objectives (Chan & Reich, 2007; Reich & Benbasat, 2000).
4. Finally, the last dimension of alignment is the cultural dimension. This dimension includes the elements such as communication and business planning styles that would lead to enhanced effectiveness (Chan & Reich, 2007).

In this study, we focus on the strategic dimension perspective and ignore the other three dimensions.

2.2.2.3 Focus Perspective of Alignment

Tallon, Kraemer, & Gurbaxani (2000) examine alignment based on the focus of organizations. These authors group the focus types under four categories: unfocused, operations-focus, market-focus and dual-focus. The main criterion to determine these types is the level of managers perception regarding how and where ES creates business value. Focused firms are the ones where the management's attention is on using ES in order to support business strategy. Operations-focused firms mainly focus on operational effectiveness and strategic positioning of use of ES in order to enhance performance. Firms with market-focus concentrate on enhancing value by using Enterprise Wide Information Systems for their customers. Firms with dual focus can gain more than operational effectiveness and strategic positioning towards building a new market (Tallon et al. 2000). According to Tallon et al. (2000) focused firms regardless of focus type can achieve better alignment than un-focused firms, which lack clear goals since the management is more willing to take advantage and create more value with a focused and goal-oriented approach. In addition, the perception of executives regarding the benefits of ES as a strategic component is limited and the pay off for Enterprise Wide Information Systems is less in this type of organization compared to the focused ones.

2.2.2.4 Level Perspective of Alignment

Alignment has been examined based on different levels in the organization as well as different perspectives. Chan & Reich (2007) state that all levels of an organization, from individual to organizational level, including project, and system levels, should be aligned in order to take full advantage of alignment. In addition to the level perspective, Henderson and

Venkatraman (1993) state alignment can be examined not only internally but also externally. While industry and technology related issues drive the external factors, ES processes and infrastructure are the inner factors organizations need to take into consideration during alignment (Chan & Reich, 2007; Henderson & Venkatraman, 1993). Our focus in this study is the organizational level.

2.2.3 Pros and Cons of Alignment

The benefits of aligning business and ES strategies have been recognized by researchers and practitioners (Croteau & Bergeron, 2001; Sabherwal & Chan, 2001; Chan et al. 1997; Henderson & Venkatraman, 1993). Some benefits of aligning ES to business strategies include (1) increasing organizations return on ES investment; (2) improving companies' competitiveness; (3) enhancing flexibility (Avison et al. 2004); and (4) profitability of organizations (Papp, 2001; Galliers, 1991). With the alignment, organizations can have the traditional benefits of IT/IS/ES in terms of having an organization's operations accepted by executives (Huang & Hu, 2007) as well as obtaining top management support (Lederer & Mendelow, 1989). Studies also show alignment is one of the critical issues for economic performance (Ciborra, 1997). Studies of Chan (Chan & Reich, 2007; Chan et al. 2006) also support the notion that alignment improves the performance by allowing organizations to use ES more strategically. In addition, Papp (1999) states alignment is a key area managers focus on in order to improve financial performance.

Studies in ES literature have revealed the highest benefit of information systems occur when the alignment is strategic (Chan & Reich, 2007; Levy, 2000). The authors define the concept strategic as being valuable and having competitive advantage.

Although the majority of researchers have agreed on the benefits of alignment, several researchers argue too much alignment may cause problems. Too much alignment would cause organizations to attach or be dependent to the components and this attachment causes difficulties in flexibility and adaptation to environment (Kathuria, Joshi, & Porth, 2007). Avison et al. (2004) argue too much alignment (fit) may have a negative effect on the strategic flexibility of the organization. According to Pascala (1999), the borderline for alignment should be based on

the notion of equilibrium, which refers to flexibility and adaptability to dynamic environment. According to these authors, organizations need to have adaptive systems and if the alignment or fit causes equilibrium in terms of losing flexibility and adjustability to dynamic environments, production of organizations would be affected negatively.

Maes (1999) argues alignment is inadvisable. There are differences between the way the real life strategy implications are and the way humans act in terms of structure (Avison et al. 2004; Avison, Cuthbertson, & Powell, 1999). In addition, alignment requires several difficult, if not impossible conditions such as full control by management (Avison et al. 2004; Newell, Huang, Galliers, & Pan, 2003). According to (Ciborra (1997), studies on alignment are too theoretical and this makes alignment non-practical. In support of this view, Chan & Reich (2007) mention the main reasons why alignment is not always successful. These reasons include: (1) the dynamic structure of business that requires continuous adaptation; (2) difficulties in accomplishing alignment under different and especially unknown strategies; (3) inability of alignment to capture real life; (4) inexperienced managers about business (Baets, 1996); and (5) the conflict between alignment and business regarding the priority.

2.2.4 Assessment of Alignment

Although there are many studies examining alignment, there are only a few that mention how to assess or achieve alignment. Papp (1999) suggests a method for managers to achieve alignment that will enhance profitability and improve financial performance. The steps to better performance include following an alignment model to determine the organization's perspective, learning to leverage the benefits of ES, matching the appropriate financial measurements to alignment, clarifying the roles, and continuously reviewing the alignment process (Papp, 1999).

According to Chan & Reich (2007) both ES and business executives should feel responsible for working towards achieving alignment. Sharing the knowledge among managerial and ES departments and members of these departments, creating a culture emphasizing this, including both formal and informal structures, adapting any required changes (i.e., ES strategy) in environment are among the key requirements that organizations need to take into consideration in order to increase alignment (Chan & Reich, 2007).

The debates regarding alignment also have lead researchers to examine alignment from different research methods as well as different perspectives (Madapusi & D'Souza, 2005; Luftman, 2003; Prahalad & Krishnan, 2002; Sauer & Willcocks, 2002; Hirschheim & Sabherwal, 2001; Reich & Benbasat, 2000; Sabherwal & Chan, 2001; Luftman & Brier, 1999). Different methods are used to measure alignment because researchers want to find the best measurement tool so alignment would be more manageable for practitioners (Chan & Reich, 2007).

Symons (2005) states alignment is a continuous process and must be checked periodically and recommends three main categories for measuring strategic alignment: i) meetings regarding IT steering committee and IT/business planning; ii) projects that are measuring the percentage of projects directly linked to strategic objectives, that have a post-implementation audit, and have ROI by business; and iii) budget regarding the new initiatives (Symons, 2005, p.4). According to Symons (2005) there are five stages an organization can be at regarding the alignment (p.2):

- "Nonexistent: There is a complete lack of any effort to align IT [ES] and business strategy. IT functions in a purely support role.
- Ad hoc: There is evidence the organization recognizes the need to align IT [ES] and business strategy. However, there are no standardized processes. There are fragmented attempts, often on a case-by-case basis within individual business units.
- Repeatable: There is awareness of alignment issues across the enterprise. Alignment activities are under development, which include processes, structures, and educational activities. Some strategy alignment takes place in some business units but not across the entire enterprise. Some attempts are made to measure and quantify the benefits.
- Defined Process: The need for IT [ES] and business strategy alignment is understood and accepted. A baseline set of processes is defined, documented, and integrated into strategic and operational planning. Measurement criteria are developed, and activity is monitored. Overall accountability is clear, and management is rewarded based on results.
- Optimized: There is advanced understanding of IT [ES] and business strategy alignment. Processes have been refined to a level of external best practices, based on results of continuous improvement and maturity modeling with other organizations. External

experts are leveraged, and benchmarks are used for guidance. Monitoring, self-assessment, and communication about alignment expectations are pervasive."

Sabherwal & Chan (2001) use questionnaire surveys as well as Miles and Snow typology to measure the strategy and assess the alignment, while (Reich & Benbasat (2000) and Hirschheim & Sabherwal (2001) use case studies in order to measure alignment. Tallon et al. (2000) measure alignment based on the level of support of ES strategy on business strategy. Sabherwal & Kirs (1994) use mathematic calculations, weighted Euclidean distance to measure misalignment. One of the highly cited and used tools, Strategic Orientation of Business Enterprise (STROBE), developed by (Venkatraman, 1989), has been extended by Chan et al. (1997) as Strategic Orientation of IS (STROIS) in order to model alignment. Burn (1993) developed the Organizational Cultural Audit (OCA) framework to measure alignment in three phases: organization, its strategy, and functional implementation of it. In addition, Chan & Huff (1993) state organizations pass through three stages to be aligned: Awareness, Integration, and Alignment. In Awareness stage, organizations realize their enterprise systems is not an ordinary back-office anymore; In Integration stage, management realizes their information systems should work together with their business operations; and finally Alignment where management works through integrating their systems with organizations strategic. In another study, Peak, Guynes, & Kroon (2005) propose a roadmap for assessing strategic alignment in an organization. The four business information dimensions ranging from strategic view and operational view of information such as business processes, information needs, and ES products or systems interact with each other and finally suggest ES solutions. These solutions, with information concerns, form the roadmap for assessing alignment.

2.2.5 Types of Alignment

Although there has been an extensive amount of work on alignment, there remains confusion on several aspects such as what is alignment, how it is achieved, does it really worth, etc. One plausible explanation of this confusion pertains to its definition, purpose, type, and the focus of alignment. This might be cleared by examining the evolution of alignment. In this study, we will build a similar, but more comprehensive categorization to studies of King & Teo (1997), Peppard and Breu (2003) and Sabherwal et al. (2001) regarding alignment between ES and business that is supported by more research studies. See Table 2 for the extended version of the

studies of Peppard & Breu (2003) and Sabherwal et al. (2001), summarizing the types of alignment, components of alignment and the supporting references in an evolutionary perspective. Tables 3-8 are detailed examination and extensions of Table 2.

Table 2 Alignment Types and Components

Type of Alignment	Components	Authors
Business Alignment	Business Strategy & Business Structure	Miles & Snow (1978), Das et al. (1991)
Strategic Alignment	Business Strategy & ES Strategy	Earl (1989), King (1978), Peters, Heng, & Vet (2002), Camillus & Lederer (1985), Segev (1989), Wiseman (1985), Henderson & Venkatraman (1989), Henderson & Venkatraman (1993), Hirschheim & Sabherwal (2001), Chan et al. (2006), Oh & Pinsonneault (2007), Tallon (2008), Raymond & Croteau (2009), Tallon & Pinsonneault (2011)
Structural Alignment (or Business – ES Structural Alignment)	Business Structure & ES Structure	Ein-Dor & Segev (1982), Brown, & Eisenhardt (1997), Brown (1997), Jelinek & Schoonhoven (1990), Croteau, Solomon, Raynold, & Bergeron (2001)
Information Systems Alignment	ES Strategy & ES Structure (and sometimes Business Structure)	Broadbent & Weill (1993), Brown (1997)
Cross-Dimensional Alignment	Business Structure & ES Strategy, and Business Strategy & ES Structure	Brown & Magill (1998), Tavakolian (1989), Das et al. (1991), Henderson & Venkatraman 1989; Henderson & Venkatraman (1993)
Alignment Mechanisms	Mechanisms and Enablers	Earl (1993), Keen (1993), Luftman & Brier (1999), Mata, Fuerst, & Barney (1995), Ross & Weill (2002), Huang & Hu (2007), Chan et al. (2006), Fabi, Raymond, & Lacoursiere (2009)

Source: The table has been extended from the literature based on Sabherwal et al. (2001, p.183), and excerpted from Beyond Alignment: A Coevolutionary View of the Information Systems Strategy Process by Peppard & Breu (2003, p.744) studies (Adapted with Permission).

This categorization regarding evolution mentions the separate group of studies having focus on alignment from different perspectives that have evolved during the alignment studies in literature. However, this does not necessarily mean there is no overlap between categories. Several studies include some issues that may belong to two categories. In addition, some scholars have contributed to more than one perspective; therefore, their names have been cited under more than one category.

2.2.5.1 Business Alignment

The first type of alignment is called Business Alignment (Sabherwal et al. 2001). In the 1970s, Strategic Information Systems had not evolved yet and Enterprise Systems were just used for determining what would be the business computing needs in the future (King & Teo, 1997). Business alignment mainly focused on the alignment between business strategy and business structure. The leading scholars in this research were Miles & Snow (1978) and Das et al. (1991) (see Table 3).

Miles & Snow (1978) examined strategy, structure, and process of an organization as well as their relationships in a way that identifies organizations and their integration with their own environments. Miles and Snow (1978) classify organizations into four theoretical categories: (1) defenders; (2) prospectors; (3) analyzers; and (4) reactors. Defenders refer to organizations that have a narrow product-market domain. In this type of organization, managers are usually experts in the organization and are not interested in opportunities external to their own domains. These organizations focus on cost saving, improving efficiency rather than adapting new technologies, structures, or operations, or product development. They follow a classical planning sequence of "plan-act-evaluate". Management style and decision making in this type of organization is usually centralized and more autocratic (Tavakolian, 1989; Miles & Snow, 1978).

Prospectors refer to organizations that seek market opportunities and effectiveness. These organizations usually adapt to emerging environment trends quickly and initiate the change that others need to respond. They are product and market innovation centric and not as efficient as defenders. They follow "evaluate-act-plan" sequence in their planning process. Management

style and decision making in this type of organizations is decentralized, and more based on participation (Tavakolian, 1989; Miles & Snow, 1978).

Analyzers combine the strengths of Defenders and Prospectors. Under existence of stable business environments, Analyzers follow a certain structure and process. In other cases managers watch the competitors and adopt the most promising one. The main characteristic of Analyzers is to minimize risk while maximizing growth. They both use "plan-act-evaluate" and "evaluate-plan-act" sequence of planning based on whether the environment is stable or more turbulent. The management style and decision making in this type of organizations is balanced and concerned with both efficiency and effectiveness (Tavakolian, 1989; Miles & Snow, 1978).

Reactors are the organizations that do not have a stable strategy-structure relationship. Although managers recognize the need for change, these organizations lack the ability to respond to these needs effectively. Environmental pressure is the main effect that makes Reactors adjust themselves (Miles & Snow, 1978).

The Miles and Snow typology is widely used in literature. For example, Hambrick (1983) examine Miles and Snow's typology to find how effectiveness varies among different industries and the effects of functional tendencies on strategic type choice. Burgelman (1983) examine the relationship between the Miles and Snow typology and strategies proposed by Mintzberg. Lately, Sabherwal & Chan (2001) examine strategic alignment by using Miles and Snow typology.

Das et al. (1991) developed a framework that integrates strategic ES planning with competitive strategy. Their framework includes competitive (business) strategy, strategic ES planning that focuses on content and process of the strategic planning, fit, competitive advantage, and financial performance. Das et al. (1991) proposed two dimensions to examine strategic planning based on literature: content, and process dimensions. The content dimension includes distinctive competences (in terms of flexibility, ability to provide required information), dominant ES technology (in terms of level and source of technology), system design, and infrastructure components (i.e., technical, administrative, and organizational). Process dimension include five components: formality, scope, participation, influence, and coordination. These

components refer to structure, comprehensiveness, contribution, power of management (either person or unit), and integration of ES planning respectively. The authors also employ Miles and Snow's typology of business strategy in their study (see Figure 2)

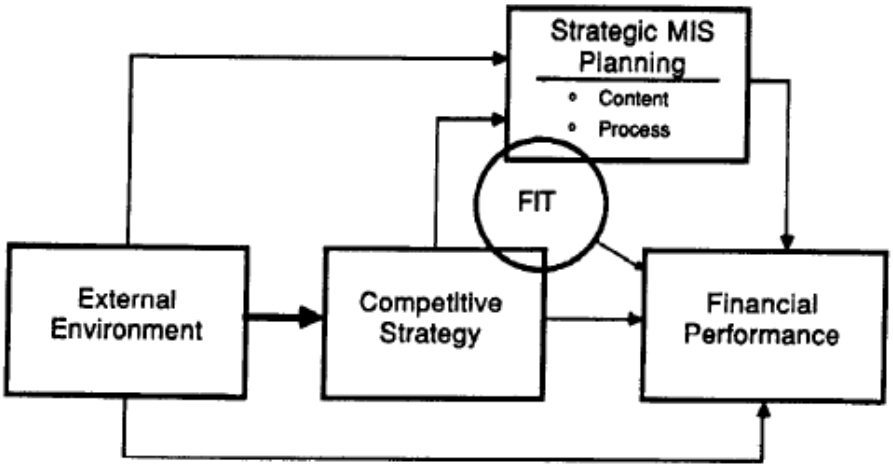

Figure 2 Fit between "External Environment", "Competitive Strategy", "Financial Performance", and "Strategic MIS Planning" (Das et al. 1991, p.955)

The authors suggest that:

1. Competitive advantage and superior company performance involves strategic ES planning with content and process.
2. There is a positive correlation between strategic ES planning and competitive strategy fit.
3. There is a positive correlation between a company's financial performances and fit among strategic ES planning dimensions within a particular business strategy.
4. Financial performance is positively correlated with the success of match between defender, analyzer, and prospector and proposed theoretical profile.

Table 3 Business Alignment Studies

Discussion	Authors
Their study focuses on business strategy and business structure. Their typology includes four types of organizations: (1) defenders; (2) prospectors; (3) analyzers; and (4) reactors.	Miles & Snow (1978)
Their study integrates strategic ES planning with competitive strategy. While the authors examine strategic planning in terms of content and process dimensions, they examine business (competitive) strategy by using Miles and Snow typology.	Das et al. (1991)

2.2.5.2 Strategic Alignment

The second type of alignment is Strategic Alignment (Sabherwal et al. 2001). This type of alignment refers to the alignment between business strategy and ES strategy. Luftman & McLean (2004) define strategic alignment as "applying IT [ES] in an appropriate and timely way, in harmony with business strategies, goals and needs" (p. 90). In strategic alignment, aligning ES investment with organization strategy is the main issue. Critical success factors, or value chain analysis type of techniques, are used to support the alignment process (Sabherwal et al. 2001). Alignment is usually considered as a process where the requirements are delivered with a top-down approach (Peters et al. 2002; Earl, 1989; Segev, 1989; Camillus & Lederer, 1985; King, 1978) (see Table 4).

Earlier studies accept alignment as a top-down strategic planning event where the business strategy is effective in planning ES strategy (Peters et al. 2002). Peters et al. (2002) suggest two approaches regarding how enterprise systems strategy is developed: The first approach is that ES strategy pertains to the business strategy while the second approach pertains to the changes in the environment as an evolutionary process. Earl (1989) considered ES strategies as business-led and demand-oriented whose aim is to support business strategies.

On the other hand, King (1978) examine strategic ES planning process and its components. Organizational strategy set is the main part of strategic ES planning and includes an informational set regarding organization's mission, objectives, strategies, and related attributes. ES strategy set can be shaped by the organizational strategy set and includes system objectives, constraints, and design strategies. The main objective of strategic ES planning is to ensure that Enterprise Wide Information Systems is an integral part of the organization and is developed

accordingly. Camillus & Lederer (1985) also support the idea and state enterprise systems should be designed as aligned to strategic management processes of the organization. Moreover, these authors suggest the design of the enterprise systems should be aligned with the organization's administrative system's structure, strategy, and style components in order to contribute to the effectiveness of the organization.

Segev (1989) examine two business-level strategic typologies: (1) Porter's Overall Cost Leadership, Differentiation, Focus, and 'Stuck in the Middle' cost leadership and growth, generic competitive strategies; and (2) Miles and Snow's typology of strategic types and compares and synthesizes these two typologies based on proximities among the strategies. The author finds the differences and similarities of two typologies and distinguishes the matching business and ES strategies that can be aligned. He finds defenders are a low cost strategy while analyzers are low cost, differentiation, growth, alliance, and innovation strategies, and prospectors are differentiation, growth, alliance, and innovation strategies.

Jarvenpaa and Ives (Jarvenpaa & Ives, 1994, 1990) examine ES strategy by using a taxonomy approach. The authors focus on generic ES strategies such as headquarter driven and independent ES strategies. Their suggestion is in favor of combination and integration of both of these strategies that interact with business strategies.

Hirschheim & Sabherwal (2001) examine strategic ES alignment, which focuses on the ES strategy affecting business strategy. The authors define strategic alignment based on three arguments:

1. Structure and the strategic decision capabilities are crucial for the organizations' performance,
2. There is an interaction between organizations and technology. While Enterprise Wide Information Systems is influenced by business strategy, business strategy is also influenced by Enterprise Wide Information Systems,
3. Alignment is a process rather than an event and it requires adaptation to change.

Strategic ES alignment deals with how ES objectives and plans are supported by business objectives and plans (Hirschheim & Sabherwal, 2001). The difference between Hirschheim and Sabherwal's study and earlier works is primarily related to the direction of alignment. While earlier studies discuss alignment as aligning ES strategy to business strategy, Hirschheim & Sabherwal (2001) present how ES strategy affects business strategy. Hirschheim & Sabherwal (2001) use Miles and Snow typology (Defenders, Prospectors, and Analyzers) while defining business strategy and view ES strategy from a multi-dimensional perspective where the focus was on the ES role (efficiency, comprehensiveness, and opportunism), ES sourcing agreement (outsourcing, selective sourcing, and in sourcing), and ES structure (centralized, shared, and decentralized). The authors state that ES strategy and business strategy should be aligned in order to enhance the performance.

Henderson and Venkatraman (Henderson & Venkatraman, 1993; Henderson & Venkatraman, 1989) develop a model for conceptualizing strategic management of information technology called the Strategic Alignment Model (SAM). This model has four dimensions each having sub-dimensions. The dimensions of the model are: (1) business strategy (including sub-dimensions business scope, distinctive competencies, and business governance); (2) "information technology strategy" (including sub-dimensions technology scope, systematic competencies, and ES governance); (3) organizational infrastructure and processes (including sub-dimensions administrative infrastructure, processes, and skills); and (4) information technology infrastructure and processes (including sub-dimensions ES infrastructure, processes, and skills).

Henderson and Venkatraman (Henderson & Venkatraman, 1993; Henderson & Venkatraman, 1989) examine these dimensions from three main perspectives of strategic management:

1. Strategic fit between external (business strategy and ES strategy) and internal (organizational infrastructure and processes, and ES infrastructure and processes) components,
2. Functional integration between business (business strategy and organizational infrastructure, and processes) and ES (ES strategy and ES infrastructure and processes) components, and

3. Cross-dimensional alignment. Henderson and Venkatraman hypothesized that ES management would be more effective with ES planning, which focuses on strategic alignment.

Henderson & H. Venkatraman (1989) and Henderson & Venkatraman (1993) consider alignment as a process that adapts to changes rather than being a static event. They also include strategic and structural components as crucial parts for alignment. The alignment between business and strategic ES context should include both strategic and structural elements. Managers should consider those alignments and find a balance among choices while making decisions.

In more recent studies, Tallon & Pinsonneault (2011) examine the relationship between alignment, agility and performance while ES flexibility and environmental volatility moderates the relationship among the constructs. Their results reveal alignment and ES flexibility are two important predictors for agility and are positively associated with agility. At the same time, agility mediates the relationship between alignment and performance when the environment is not volatile. Tallon (2008) examines strategic alignment with value disciplines perspective at the process level. The author examines the value discipline through business strategy, operational excellence, customer intimacy, product leadership and business processes through supplier relations, production and operations, product and service enhancement, marketing and sales, and customer relations. The results of the study indicate alignment and business value are positively associated; unlike Tallon (2008), Oh & Pinsonneault (2007) who examine strategic alignment at firm level whilst examining ES based on a portfolio of applications. In spite of the different levels of alignment, their results also reveal that alignment improves profit while reducing costs. Raymond & Croteau (2009) examine alignment between business strategies and advanced manufacturing technologies for medium-sized enterprises through the categorization of organizations by Miles and Snow (1978) typology. The authors measured performance through productivity and profitability. Their results indicate alignment is positively associated with productivity for prospectors and defenders, where alignment positive association with profitability is significant for analyzers. The differences in results of Raymond & Croteau (2009) and Sabherwal & Chan (2001) indicate alignment is a complex issue as it is very critical for

organizations (Luftman & Ben-Zvi, 2010) and yet there is no universal formula for alignment (Raymond & Croteau, 2009).

There is a confusion regarding strategic alignment and traditional linkage. Strategic alignment is not the same as traditional linkage. The focus of ES function is different in two approaches (Henderson & Venkatraman, 1993):

1. While classical linkage focuses on internal orientation, strategic alignment focuses on the fit within the ES domain that includes not only internal orientation but also external orientation (i.e., marketplace that includes scope (product and market offerings, etc.), governance (mechanisms such as alliances, vendors, etc.), and competencies (flexibility, cost-performance, etc.), etc.).
2. Traditional management perception about ES functions includes linking ES activities with business requirements. On the other hand, strategic alignment allows management to choose the appropriate alignment perspective among four dimensions (strategy execution, technology transformation, competitive potential, and service level).
3. In traditional linkage, the performance criteria include cost and service considerations while strategic alignment expands these criteria with multiple goals such as operational and strategic ones. Strategic alignment model by Henderson & Venkatraman (1993) also deals with the shift among different alignment perspectives in terms of performance.
4. Finally, strategic alignment additionally deals with the roles of ES executives.

Table 4 Strategic Alignment Studies

Discussion	Authors
Business strategy as well as the changes in the environment shapes the ES strategy.	Peters et al. (2002)
While business shapes the Enterprise Wide Information Systems, its objective is to support business strategies.	Earl (1989)
Organizational strategy shapes ES planning. Strategic ES planning must ensure that Information Systems is an integral part of organization.	King (1978)
ES should be designed as aligned to strategic management goals.	Camillus & Lederer (1985)
Examines and matches the business and Enterprise Systems strategies of Porter's Overall Cost Leadership, Differentiation, Focus, and 'Stuck in the Middle' cost leadership and growth, generic competitive strategies; and Miles and Snow's typology of strategic types.	Segev (1989)
Develop SAM that has four dimensions: business strategy, ES strategy, business infrastructure, and ES infrastructure. Alignment is considered to be a process. The model covers the dimensions as: Strategic fit between external and internal components; Functional integration between business and ES; and Cross-dimensional alignment.	Henderson & Venkatraman (1989), Henderson & Venkatraman (1993)
Alignment is a process and interaction between business and Enterprise Wide Information Systems strategies in "both" directions.	Hirschheim & Sabherwal (2001)
Alignment and ES flexibility is positively associated with agility and agility mediates the relationship between alignment and performance.	Tallon & Pinsonneault (2010)
Examine strategic alignment with value disciplines perspective at the process level.	Tallon (2008)
Examine strategic alignment at firm level whilst examining ES based on a portfolio of applications.	Oh & Pinsonneault (2007)
Examine alignment between business strategies and advanced manufacturing technologies for medium-sized enterprises through the categorization of organizations by Miles and Snow (1978) typology.	Raymond & Croteau (2009)

2.2.5.3 Structural Alignment

The third type of alignment is called Structural Alignment (Peppard & Breu, 2003). This type of alignment refers to alignment at the structural level (Ein-Dor & Segev, 1982). Structural alignment is the alignment between organizational/business structure and ES structure and stresses the structural fit between them. It may be concerned with ES decision-making rights as well (Chan, 2002). Structure alignment states that although strategy is important in alignment, structural alignment might complement it for a more successful alignment. Therefore, it emphasizes the importance of structure in alignment itself. Structural alignment mainly focuses on the fit when ES decision making rights, ES infrastructure, personnel and relationships are the main concerns (Peppard & Breu, 2003; Brown, 1997; Brown, and Eisenhardt 1997; Ein-Dor & Segev, 1982) (see Table 5).

Both business structure and ES structure have been examined from several perspectives such as Brown & Magill (1998), Al-Mashari & Zairi 2000, Al-Mashari & Zairi (2000), and (Broadbent, Weill, & Neo, 1999). One of the most common classifications for examining business structure includes three different views: (1) mechanistic or organic; (2) semi-structures or hybrid; and (3) centralized or decentralized (Sabherwal et al. 2001). Brown & Magill (1994) examine ES structure from a similar view point where they included whether it is shared in addition to being centralized or decentralized.

Brown (1997) also examines the alignment between structural variables regarding ES functions and business units. He examines how alignment of ES has evolved and/or adapted to the change of ES role. The findings indicated that organic decision making, high business unit autonomy, differentiation competitive strategy, and unstable industry environment are the main variables in the alignment. According to Chan (2002), structure can be formal and informal. Informal structure includes team work, organizational culture, and individual or departmental relationships, etc. and should be considered under structural alignment (Chan, 2002; Ravishankar et al. 2011).

Ein-Dor & Segev (1982) examine the relationship between ES structure and organizational context. In terms of organizational context, organizational size, structure, time frame, and psychological climate toward ES were included as the variables defining the organizational context. While examining the ES structure, because of its multi-attribute structure, several dimensions such as the degree of centralization of ES, degree of integration of ES, deployment of hardware, and place within the organizational hierarchy were included (Ein-Dor & Segev, 1982). Integration or alignment of Enterprise Wide Information Systems is discussed from two perspectives: integration of data and integration of models feeding into each other. Their result shows ES structure is associated with organizational structure, size of the organization as well as attitude to ES, the rank of ES manager and the relationship between implementer and user. Organizational structure is associated with degree of ES and hardware centralization, degree of ES integration, software properties, and rank of ES manager.

Ahituv, Neumann, & Zviran (1989), Earl (1989), and Clark (1992) with their empirical studies and King (1983) with his conceptual study examine the relationship between ES governance and organizational context (Brown, 1997). While Ahituv et al. (1989) focus on organizational size, industry, organizational structure (matrix, functional, etc.), and process distribution (centralized, integrated, decentralized) in the organizational context and degree of centralization, hardware distribution, and ES function as ES governance, meanwhile Earl (1989) focuses on organizational structure, control systems, organizational culture in organization context and degree of centralization (centralized, business unit, business venture, decentralized, and federal) as ES governance. Clark (1992) focuses on alignment between organizational structure and ES structure by examining only ES component in terms of the degree of centralization and organizational context in terms of industry and firm size.

Croteau, Solomon, Raynold, & Bergeron (2001) examine how organizations can improve their performance by focusing on aligning their business and ES structure. The authors measure business structure construct through cooperation, overall vision, adaptability, and authority while measuring ES/technology structure through user involvement, connectivity, flexibility, technology awareness, and distributed computing. Their results indicate a positive relationship between aligning business and Enterprise Wide Information Systems structure and performance.

Table 5 Structural Alignment Studies

Discussion	Authors
Examines the alignment between ES structure and business units. Alignment is affected by organic decision making, high business unit autonomy, differentiation competitive strategy, and unstable industry environment.	Brown (1997)
ES structure is associated with organizational structure. ES structure refers to degree of centralization of ES, degree of integration of ES, deployment of hardware, and place within the organizational hierarchy, while organizational structure refers to organizational size, structure, time frame, and psychological climate toward ES.	Ein-Dor & Segev (1982)
Alignment between business structure (through cooperation, overall vision, adaptability, and authority) and ES/technology structure (through user involvement, connectivity, flexibility, technology awareness, and distributed computing) improves the business performance.	Croteau et al. (2001)

2.2.5.4 Information Systems Alignment

The fourth type of alignment is called ES Alignment (Sabherwal et al. 2001). ES alignment refers to the dynamic alignment between ES structure and ES strategy. However, some studies have stressed the importance of ES structure while focusing on the alignment between business strategy and ES strategy. Most of the studies within this category focus on different aspects such as the variety of strategic choices, how these choices are related to each other, and how managers dealt with those choices under different circumstances. This type of alignment requires a continuous adaptation due to the high volatility of the conditions. Because of these conditions, this alignment has been seen as a process rather than an event (Peppard & Breu, 2003; Hirschheim & Sabherwal, 2001; Brown, 1997; Henderson & Venkatraman, 1993; Broadbent & Weill, 1993) (see Table 6).

The focus of Enterprise Wide Information Systems alignment has been mainly the overall ES structure and ES strategy rather than ES methodology (Broadbent & Weill, 1993). Broadbent & Weill (1993) examine alignment in the Australian banking industry in order to identify the organizational policies and practices that interact within alignment business and information strategies as well as structure. Based on their study, the authors developed a model and found support for 15 of their propositions. The propositions are grouped into four categories as follows:

1. Strategy Formation Process for the whole organization
2. Organizational Structure
3. ES Policies, Practices, and Responsibilities
4. ES Strategy

The Strategy Formation Process for the organization refers to how a strategy is developed for every unit of the organization. Participation, documentation, planning time frame, level of experience in planning, and the attitude of management towards ES strategy are the main issues. Organizational Structure refers to the responsibilities and reporting in the organization. ES policies, practices, and responsibilities refers to the arrangements in ES area while ES structure refers to more technical issues in order to decide the technology to be used in the organization (see Figure 3).

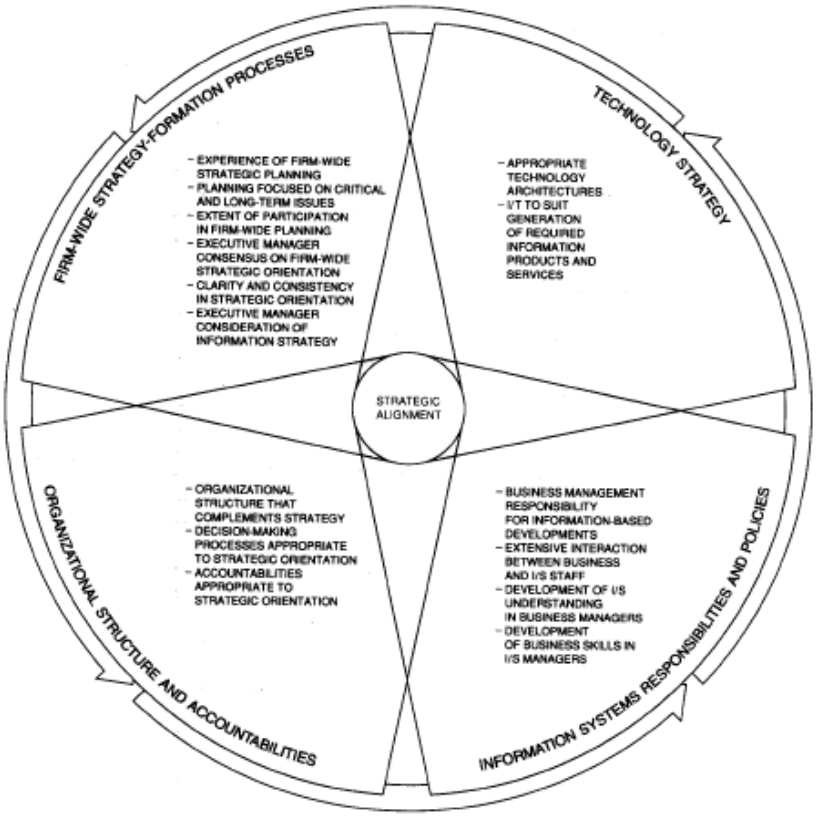

Figure 3 Alignment Model (Broadbent & Weill, 1993, p.175)

The study is consistent with Earl (1989), Henderson & Venkatraman (1989) findings. The findings related to alignment indicate focusing on the overall organizational ES structure rather than ES methodologies at the functional level is central to alignment. Other findings indicate the fact that ES strategy should be consistent with business needs and ES strategy should be a flexible and issue-oriented process.

Table 6 Information Systems Alignment Studies

Discussion	Authors
Examine alignment between ES strategy and ES structure. Based on the framework: Strategy Formation Process (how a strategy is developed), Organizational Structure (responsibilities and reporting), ES policies, practices, and responsibilities, and ES structure (technical issues) are the essential components regarding alignment.	Broadbent & Weill (1993)

2.2.5.5 Cross-Dimensional Alignment

The fifth type of alignment is called Cross-Dimensional Alignment (Sabherwal et al. 2001). This alignment refers to alignment across dimensions: alignment between business structure and ES strategy, and alignment between business strategy and ES structure (Brown & Magill, 1998; Henderson & Venkatraman, 1993; Das et al. 1991; Henderson & Venkatraman, 1989; Tavakolian, 1989) (see Table 7).

Tavakolian (1989) examines the alignment between ES structure and business strategy. The author defines ES structure based on several aspects such as organizational decision making, organizational form (either functional organizational form or product organizational form), organizational size, and competitive strategy while using Miles and Snow typology with Defenders, Prospectors, Analyzers, and Reactors to define business strategy. The author divides the ES activities into three categories: (1) system development and maintenance; (2) systems operations; and (3) system administration by examining their degree of centralization. Tavakolian (1989) hypothesizes ES structure is related to business strategy and the strategic types of organizations differ based on the degree of centralization of ES activities. His findings support the idea that ES structure is strongly related to business strategy.

Brown & Magill (1998) examine how ES structure should be designed in order to contribute more to successful organizational strategies. Their study focuses on the level of centralization of decision responsibilities to accomplish a set of organizational activities. Their propositions clarified a business unit's whether centralized, decentralized, or compromise design based on (a) business-level strategy; (b) the degree to which extent the ES has strategic role on the business unit; (c) managers' level of ES knowledge; and (d) the degree to which extent the ES related opportunities are pursued. This study showed corporate level (opportunities for ES-related cross-unit synergies) and business level (strategic ES role, line-manager ES knowledge) factors are predictors for strategy.

The model developed by Henderson and Venkatraman (Henderson & Venkatraman, 1993; Henderson & Venkatraman, 1989) deals with cross-dimensional alignment as well. While the authors define four perspectives, (1) technology exploitation; (2) technology leverage; (3)

strategy implementation; and (4) technology implementation, by focusing on three domains as (a) anchor domain; (b) pivot domain; and (c) impact domains, they also deal with cross-dimensional alignment in addition to strategic fit and functional integration.

Table 7 Cross-Dimensional Alignment Studies

Discussion	Authors
Examine the alignment between ES structure (in terms of organizational decision making, organizational form, organizational size, and competitive strategy) and business strategy (from Miles and Snow typology of Defenders, Prospectors, Analyzers, and Reactors perspective). He found that ES structure is strongly related to business strategy.	Tavakolian (1989)
ES structure should be designed to pursuit successful organizational strategies. In addition, authors found that opportunities for ES-related cross-unit synergies are essential for corporate level strategies while strategic ES role, line-manager ES knowledge are essential for business level strategies.	Brown & Magill (1998)
Examine cross dimensional alignment and (1) technology exploitation; (2) technology leverage; (3) strategy implementation; and (4) technology implementation based on the four domains of SAM (business strategy, ES strategy, business infrastructure, and ES infrastructure).	Henderson & Venkatraman (1989), Henderson & Venkatraman (1993)

2.2.5.6 Alignment Mechanisms

The sixth type of alignment within the evolution of alignment is called Alignment Mechanisms (Peppard & Breu, 2003). This type of alignment supports the dynamism of the mechanisms and enablers of alignment by putting forth that process view does not provide enough information regarding the interaction of processes. Alignment is an active design that aims the managing of ES functions rather than being just a passive match between ES and business (Huang & Hu, 2007). Huang & Hu (2007) also indicate alignment is a process and propose alignment is a mindset regarding the way ES and business work. One stream of research, which defines alignment as unification of ES and business, challenge the statement of Henderson and Venkatraman by arguing that ES and business strategies are separate. The end goal for alignment is sustainable competitive advantage (Huang & Hu, 2007; Peppard & Breu, 2003; Ross & Weill, 2002; Keen, 1993; Luftman & Brier, 1999; Mata et al. 1995; Earl, 1993) (see Table 8).

Earl (1993) examines 27 companies and found there were five different strategic ES planning approaches companies use: (1) Business-Led; (2) Method-Driven; (3) Administrative; (4) Technological; and (5) Organizational. The author concluded organizational approach is the best among five in order to achieve alignment. Organizational approach is also found to be the most effective approach in an environment where Enterprise Wide Information Systems decisions are made through continuous harmony between organization's functions with ES.

Several researchers have agreed on the importance of aligning business and ES or ERP systems (Chen, 2009). However, there is no such agreement regarding how to achieve the harmony (Luftman & Brier, 1999). In order to fill this gap, Luftman (1996) and Luftman & Brier (1999) identify the key enablers, such as executive support, strategy development, partnership with business, setting right priorities, resource sharing, and understanding the business for ES and inhibitors, such as wrong prioritizing of ES projects, lack of close relationship with business, non-supportive executives for ES, etc. for achieving the strategic alignment. Some enablers and some inhibitors may exist in an organization and Luftman & Brier (1999) suggest a six-step approach in order to minimize inhibitors and maximize the enablers for alignment. These steps that will be worked by executives include: (a) setting goals and assigning each goal to teams; (b) recognizing the link between business and ES; (c) analyzing gaps and prioritizing them towards a solution; (d) taking the action (specifying deliverables, responsibilities, risks, and tasks); (e) determining success criteria; and (f) sustaining the alignment. ES will play an increasing role in achieving competitive advantage, therefore the executives should be cautious regarding the harmony and how to sustain it by focusing on enablers (Luftman & Brier, 1999). In another study, Luftman (2001) states enablers of strategic alignment include top management support, involvement of ES in strategy development, mutual understanding between ES and business (knowledge base, partnership), prioritization of ES projects, and leadership of ES (Luftman, 2001). Ward and Peppard (2002) state top management support is very important. The main reason for failure of ERP is the lack of management support or stakeholders, "different perceptions of the intent and benefits and extent of changes required between senior executives and operational line management and among the line managers in different functions or units" rather than the technology itself (p. 547).

Chan et al. (2006) examine the strategic alignment with its antecedents and its outcomes where these antecedents (i.e., shared domain knowledge, planning sophistication, earlier success of ES experiences, size of the organization, environmental uncertainty) and outcomes were examined based on strategy and organization types, based on Miles & Snow (1978) typology. Their results indicate a positive association between alignment and performance for most of the organizations, where industry, type and strategy of the organizations have significant impact on the relationship between alignment, antecedents of alignment and performance. In another study, Fabi et al. (2009) examine strategic alignment of Human Resource Management with strategic capabilities of product, market and network development in small-medium sized manufacturing enterprises through gestalt (multivariate profiles of coherence (p.19)) approach with Miles & Snow business strategy profiles. Their results indicate alignment is important for competitive advantage and for survival. Madapusi & D'Souza (2005) examine strategic alignment between ERP systems and international strategies in multinational enterprises, which can be identified based on different criteria such as rate of growth and structures. The authors argue that careful planning and configuration of ERP system, skilled employees, champion, and recognizing the relatedness and integration of ERP and strategy can bring success to organizations.

Literature also shows that managers have a unique impact on alignment. While their support is critical for a successful alignment, they can also be obstacles for the alignment, too. Awareness level of managers, their perceptions on technology and alignment, perceived benefits, as well as being short-term or long-term action/solution oriented are among the most common issues that determine the management attitude towards alignment (Ward & Peppard, 2002).

These differences in management styles are important components for achieving competitive advantage. Considering the case that ES resources are equally accessible by all organizations, these differences in management styles and strategies are the main elements that determine competitive advantage (Keen, 1993). While earlier studies pertaining to alignment were in favor of separating ES and business, later studies contradicted this view. For example, according to Keen (1993) business process, people, and ES should be considered together rather than being considered as separate elements. The author presents a framework that encourages and guides the executives for the fusion of ES and business. The framework includes two

dimensions: (1) business, people, and technology dimension; and (2) development (dealing with knowledge anchors, vision and strategic intent, and rules), and management of ES (dealing with strategy sourcing alliances, operations, and benefits) dimension. The developed fusion map can be used by executives in order to perceive the big picture of their businesses and focus to a specific area based on their role (Keen, 1993). Smaczny (2001) also suggests that ES should be meshed with business. Using the term fusion in order to describe alignment or integration shows the degree of integration that Smaczny suggests regarding business and ES.

These studies pertaining to ES and how it leads to sustainable competitive advantage have contributed to the research regarding alignment of business and ES (Peppard & Breu, 2003). For example, Mata et al. (1995) analyze organization, ES and competitive advantage from the resource side and identify several variables that will enhance the competitive advantage for organizations. These variables, which enable the alignment leading to competitive advantage include: (1) accessing capital for ES investments; (2) proprietary technology; (3) ES skills of firms; and (4) superior managerial skills such as the ability to develop ES applications that will support and enhance business functions (Mata et al. 1995). Ray, Barney, & Muhanna (2004), Mata et al. (1995), and Reddy (2006) also mention the rigidities that occur during the process to enhance for competitive advantage such as having capital risk, time and cost of adapting new systems, being easily imitated, etc. from the resource-based view. They also suggest applying a dynamic view which explains the evolution of resources and its capabilities in lieu of a static one in order to enhance the competitive advantage of organizations. Lee & Adams (1990) state if there is a simple method to determine how to use ES strategically, none of the companies would have a competitive advantage over others. According to Sammon, Adam, & Elichirigoity (2001), organizations need to react to new technologies as their strategic component, in spite of the fact that technology usually provides only a short term competitive advantage (Sammon et al. 2001; Vitale, 1986). Therefore, technology can be viewed as a competitive liability rather than competitive advantage (Sammon et al. 2001). Ross & Weill (2002) examine the factors affecting ES decisions and the importance of the leadership role of senior business executives in ES decisions to achieve alignment over time. The benefits of ES to an organization can be understood by the degree of ES managed rather than the technology itself (Huang & Hu, 2007). These authors also present the enablers, which include: (1) integration between ES and business

planning; (2) existence of effective communication channels between ES and other business units in the organization; (3) active relationships between ES and business including managerial level relationships; and (4) accepting alignment as part of organizational culture.

Table 8 Alignment Mechanisms

Discussion	Authors
Examine five approaches regarding the fit for alignment: Business-Led, Method-Driven, Administrative, Technological, and Organizational. Findings show that organizational approach is the best one to achieve alignment.	Earl (1993)
Suggest steps for executives to make alignment more efficient: Set goals; Recognize business-ES link; Analyze gaps; Take action; Success criteria; Sustain alignment.	Luftman & Brier (1999)
Business process, people, and ES should be considered together (fusion). Executives can develop a better understanding of the overall business as well as their role by following the fusion map, which includes two dimensions: (1) business, people, and technology dimension; and (2) development (dealing with knowledge anchors, vision and strategic intent, and rules), and management of ES	Keen (1993)
Analyze organization, ES and competitive advantage from resource side. Accessing capital for ES investments, proprietary technology, ES skills of firms, superior managerial skills are critical for alignment and competitive advantage.	Mata et al. (1995)
Senior executives have critical leadership role in ES decisions to achieve alignment.	Ross & Weill (2002)
The way Enterprise Wide Information Systems is managed is more important than just having latest technology. ES-business planning integration, communication channels and relationships between ES and other business units, attitude towards technology and alignment are critical in achieving and sustaining alignment.	Huang & Hu (2007)
Antecedents of strategic alignment (i.e., shared domain knowledge, planning sophistication, earlier success of ES experiences, size of the organization, environmental uncertainty) have significant impact on performance for most of organization types categorized by Miles & Snow (1978).	Chan et al. (2006)
Alignment of HRM with strategic capabilities of product, market, and network development in manufacturing small-medium enterprises is critical for competitive advantage and survival.	Fabi et al. (2009)

2.2.6 Alignment Models

A number of models for strategic alignment have been presented in the literature. In this section, we will cover only the well-cited models and the ones we believe have a critical role within the evolution of alignment. In this review, we also want to present the fact that alignment has a variety of perspectives. We have described alignment from these different perspectives by combining separate well-known models that define alignment models in order to give a broader

understanding for alignment. Strategic Alignment Model (SAM), which is the most cited model will be the first model mentioned and then several models extending SAM will be explained. After SAM, a second highly cited model developed by Chan (Sabherwal & Chan, 2001; Chan et al. 1997; Chan, 1992) and a variety of well-known alignment model studies, such as Weill (1992; 1990), Benbya & McKelvey (2006), Alter (2002), Raffa and Capaldo (2007), Reich and Benbasat (2000; 1996), Sabherwal et al. (2001), and Baets (1992) will be examined briefly (see Table 11).

2.2.6.1 Strategic Alignment Model

Strategic alignment literature has been built upon a series of studies and models. The most notable studies are MIT90s by Morton (1991) and Strategic Alignment Model (SAM) by Henderson & Venkatraman (1989). The MIT90s model is important since it was the initial attempt to highlight the potential of ES as a strategic function. The model's main objective is to determine how alignment would allow organizations to realize benefits from ES investments. The MIT90s model presents five levels: (1) localized exploitation; (2) internal integration; (3) business process redesign; (4) business network redesign; and (5) business scope redefinition for ES applications development. The model states as long as strategy, organizational structure, technology, individuals and roles, and management process are aligned, organizations benefit from the change (Chan & Reich, 2007). The MIT90s model had an influence for Henderson and Venkatraman to develop their model, SAM.

The Strategic Alignment Model (SAM) was developed by Henderson and Venkatraman (Henderson & Venkatraman, 1992; Henderson & Venkataramanan, 1991; Henderson & Venkatraman, 1989). The model defines different strategic choices and four different domain perspectives: (1) business strategy; (2) ES strategy; (3) organizational infrastructure and processes; and (4) ES infrastructure and processes.

SAM conceptualizes strategic alignment in terms of two dimensions: (1) strategic fit; and (2) functional integration (Henderson et al. 1996). Strategic fit is the ability to choose the external market position and the internal arrangements that lead to this external positioning decision. It is a harmony between business strategy and organizational infrastructure and

processes. One of the main assumptions of this model is overall business success depends on the strategic fit between external and internal domains (Henderson et al. 1996). Functional integration refers to the coherence between business strategy and ES strategy in an external environment or the coherence between organizational infrastructure and processes, and ES infrastructure and processes in an internal environment (Henderson et al. 1996) (see Figure 4).

Henderson & Venkatraman (1992) examine alignment from three different perspectives: (1) bivariate fit; (2) cross-domain alignment; and (3) strategic alignment. Bivariate fit is a simple relationship or congruence between two domains either horizontally (i.e., between business strategy and ES strategy, and between organizational infrastructure and processes, and ES infrastructure and processes) or vertically (i.e., between business strategy, and organizational infrastructure and processes, and between ES strategy, and ES infrastructure and processes). Cross-domain alignment is between multiple domains linked sequentially (Henderson & Venkatraman, 1992).

Organizations may define alignment perspective by drawing a line through three separate lines passing three different domain types: (1) anchor domain; (2) pivot domain; and (3) impacted domain (Luftman, 1996). Anchor domain is the strongest among the three and is the initiator for the change. Pivot domain, the middle domain between anchor domain and impacted domain, is also affected by the change initiated by the anchor domain. Impacted domain is the end element within the perspective and is affected the most since it is the final node in the action of change. Based on the anchor domain and its direction, the authors called four perspectives on ES planning as technology exploitation (ES strategy as anchor domain and over business strategy), technology leverage (business strategy as anchor domain and over ES strategy), strategy implementation (business strategy as anchor domain and over organizational infrastructure and processes), and technology implementation (ES strategy as anchor domain and over ES infrastructure and processes). The final type of relationship among domains is the strategic alignment. This alignment refers to organizational transformation across multiple domains via single (weak) or double (strong) loop simultaneously or concurrently (Luftman, 1996).

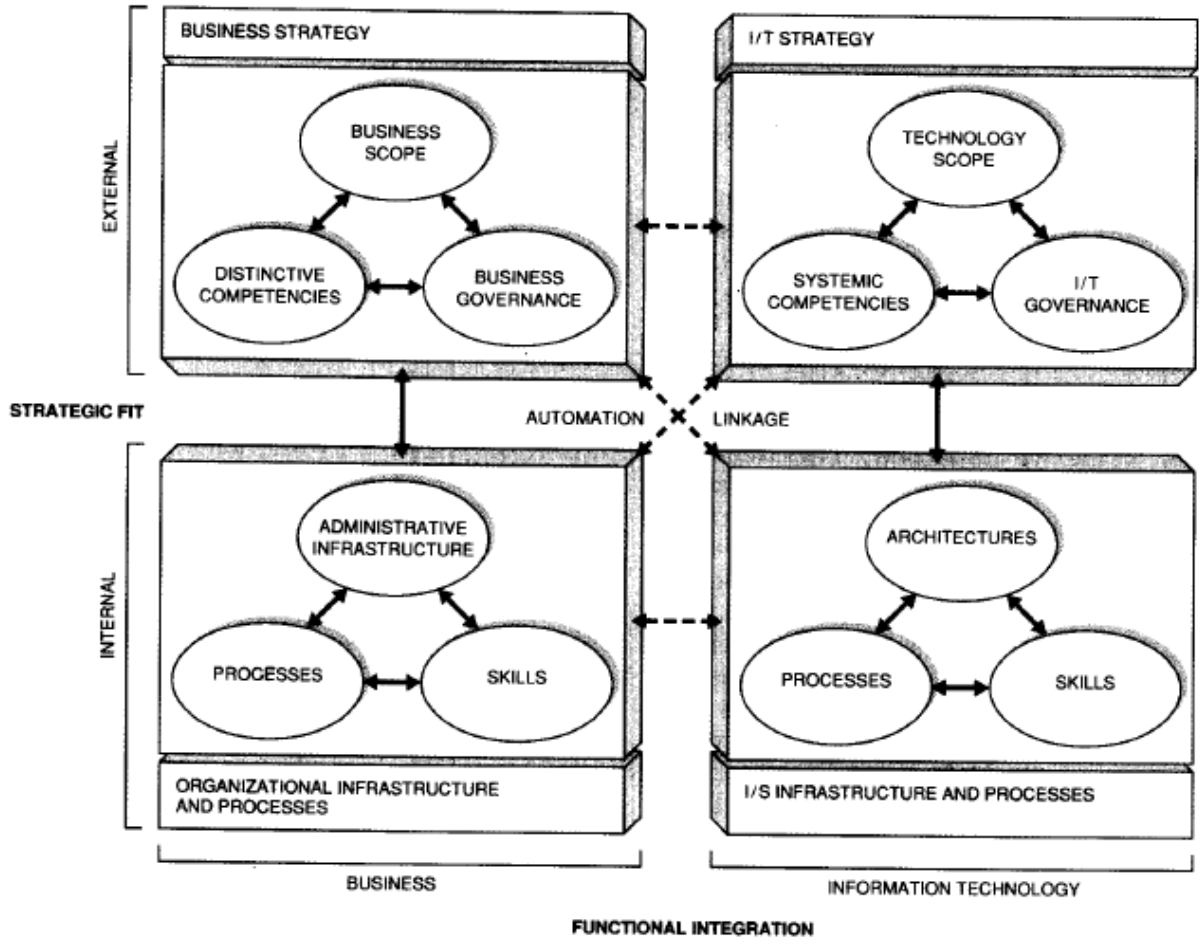

Figure 4 Strategic Alignment Model (Henderson & Venkatraman, 1993, p.476)

2.2.6.2 Derivatives of SAM

The SAM has been widely used to this day. Although only a few researchers argue that SAM was useful at the time it was developed, and it is questionable that the model addresses the needs for today's business needs (Smaczny, 2001), a majority of researchers have proven that SAM model still addresses the current business and ES situation, and have been using and extending SAM from different perspectives (see Table 9). For example, Luftman et al. (1993) use SAM in order to describe the transformation of an organization. The authors define the steps regarding how to scope, design ES strategy and planning, and transform business activities by following their framework. Luftman (1996) also expand the research by focusing on enablers and inhibitors to alignment. This study confirms the importance of communication among executives within the organization. Weill & Broadbent (1998) expand the SAM by adding a theory regarding the ways to support business strategies by investing on ES infrastructure. However,

this model also has some critique about strategic planning process regarding whether it is suitable for building the technology infrastructure or not (Smaczny, 2001). Smaczny (2001) also expand SAM and proposed a fusion model that integrates the ES role in an organization. According to the fusion view, the changes in external and internal conditions create a new strategy. The author claims there should be only one strategy where ES strategy and business strategy are seen as integrated and inseparable. Therefore, the strategy development for ES occurs while the strategy for business is being developed. This view opposes the need for alignment. Maes (1999) and Maes et al. (2000) expand the model and develop the unified framework. This framework adds new layers to both strategic integration and functional integration layers. This generic framework added a third vertical layer to functional integration by separating business and technology layers called information/communication. This layer indicated the importance of communication, interpreting, and delivering information, or in other words information sharing as well as highlighting the importance of customer oriented thinking. The horizontal layer separates strategy and operation layers and adds a third layer infrastructure. This layer shows the long term architectural infrastructure, core competencies, and management of resources.

Luftman (2000) developed an instrument in order to measure the maturity of strategic alignment. The instrument involves five levels: (a) initial ad/hoc process; (b) committed process; (c) established focused process; (d) improved/managed process; and (e) optimized or aligned process. The author also determined six criteria for aligning ES and business maturity of communications, value measurement, governance, partnership, scope and architecture, and skills that are part of each level.

According to Luftman (2000) alignment is evolutionary and the Strategic Alignment Maturity Assessment instrument provides a tool for evaluating the location and direction within the alignment process. The author examines the alignment process in six steps: (a) goal setting; (b) good understanding of the linkage between business and ES; (c) analyzing the gaps; (d) choosing the right action; (e) determining the success criteria based on the goals; and (f) sustaining alignment.

While there are several empirical and theoretical supports for SAM, there are some critiques of the model as well. Some of the critiques for SAM include being inflexible, technically dated, and having hardware bias (Avison et al. 2004). Burn & Szeto (2000) also argue the model may not be applicable based on the ES-intensiveness of the industry.

In a recent study Chevez (2010) improves SAM by developing a model that combines four of the most visited alignment models: Strategic Alignment Model (SAM), Strategic Alignment Maturity Model (SAMM) (Luftman, 1999), information system strategic alignment model by Chan and an operational model of strategic alignment by Bergeron et al. (2003). The author ranks the individual elements of the model that has all the elements of aforementioned alignment models based on perceptions of according managers, ES Directors and ES experts. Gudas & Brundzaite (2006) propose a model as extension to SAM where the authors place knowledge management system in among the four domains of SAM. The authors argue knowledge management of ES and business should be the central focus of strategic alignment.

Table 9 Derivatives of SAM

Authors	Argument and/or Extension
Luftman et al. (1993)	Modify SAM in order to describe transformation of organization
Luftman (1996), Luftman (2000)	Extend SAM to include enablers and inhibitors Presented Strategic Alignment Maturity Assessment instrument
Smaczny (2001)	Extend SAM to build a fusion model that state the existence of an integrated ES and business strategy because of external and internal factors
Weill & Broadbent (1998)	Extend SAM to include the ways to support business strategies by investing on ES infrastructure
Maes (1999), Maes et al. (2000)	Develop unified framework that add new layers as vertical (information/communication) and horizontal (infrastructure) in order to emphasize the importance of communication and long term architectural infrastructure, core competencies, and management of resources respectively.
Chevez (2010)	Proposes a unified model as the combination of SAM, SAMM, Chan's model, as well as Bergeron et al. (2003) alignment model.
Gudas & Brundzaite (2006)	Extend SAM to include Knowledge Management system between the four domains of SAM.

2.2.6.3 Strategic Alignment – Chan's Model

Chan has developed a model for strategic orientation and alignment and examined the relationship among business strategy, ES strategy, and performance through this model. The

model developed in the studies of Chan (Sabherwal & Chan, 2001; Chan et al. 1997; Chan, 1992) is a comprehensive one that combines different models and instruments from different studies. The studies of Chan focus on the relationship between Enterprise Wide Information Systems strategic alignment, fit between business and ES strategic orientation, ES effectiveness, and business performance. The authors find that alignment and performance are positively correlated for prospectors and analyzers, while no significant correlation is found for defenders. Their studies show that business success and performance are improved by the alignment in many organizations.

Several instruments for different areas such as business strategies, ES strategies, effectiveness, and business performance were used simultaneously in her studies. The first area for business strategy is called Strategic Orientation of Business Enterprises (STROBE). The dimensions of STROBE include aggressiveness, analysis, internal defensiveness, external defensiveness, futurity, pro-activeness, and risk aversion. See Table 10 for the dimensions and their definitions. In addition Chan used and extended SAM by adding an Information Systems feature.

Table 10 Dimensions of STROBE and their Definitions

Dimension/Attribute	Definition by Venkataramanan (1989, p.948 and 949)
Aggressiveness	"The posture adopted by a business in its allocation of resources for improving market positions at a relatively faster rate than the competitors in its chosen market."
Analysis	"The trait of overall problem solving posture ... including tendency to search deeper for roots of problems and to generate the best possible solution alternatives." In addition, internal consistency, comprehensiveness, and resource allocation are among the concepts that "analysis" is related to.
Defensiveness	"Defensive behavior ... with emphasis on cost reduction and efficiency seeking methods."
Futurity	"Temporal considerations reflected in key strategic decisions, in terms of the relative emphasis of effectiveness (longer-term) considerations versus efficiency (shorter-term) considerations."
Proactiveness	"Proactive behavior in relation to participation in emerging industries, continuous search for market opportunities and experimentation with potential responses to changing environmental trends."
Risk aversion	Opposite of "riskiness" that is related to ""resource allocation decisions as well as choice of products and markets."

The second area concerns business performance. There are multiple measures of business performance (Venkatraman & Ramanujam, 1986). STROBE uses market growth and profitability to measure performance. Chan et al. (1997) found four dimensions to measure performance. These measures were market growth, profitability, product-service innovation, and company reputation. All these measures were determined based on respondents' perceptions and previous studies such as White (1986), and Venkataramanan (1989) regarding the link between business strategy and performance.

The third area pertains to ES effectiveness. This area is built on user information satisfaction and organizational impact. The instrument used in this area regarding ES effectiveness and business performance is developed based on studies such as Ives & Learnmonth (1984), Johnston & Vitale (1988), and Sethi (1988).

The fourth area relates to the ES strategy. This area deals with measuring strategic orientation of current ES applications, named Strategic Orientation of the Existing Portfolio of Information Systems (STROEPIS). The instrument of STROEPIS was built parallel to the STOBE instrument. The instrument used in this area regarding business strategy and ES strategy is built based on studies such as Bakos & Treacy (1986), Das et al. (1991), Henderson &

Venkatraman (1992), King (1978), McFarlan (1984), and Parsons (1983). Meanwhile, instruments to measure ES strategy and effectiveness was built on Lederer & Putnam (1986) and ES strategy and business performance is built on studies such as Earl (1989) and Weill (1990).

The final area relates to strategic ES alignment. The importance of strategic alignment is addressed by many researchers (Drazin & Van de Ven, 1985; Venkatraman & Camillus, 1984; White, 1986) in literature. The alignment or fit was measured data collected via STROBE and STROEPIS and combined each of these instruments as a bivariate model (see Figure 5).

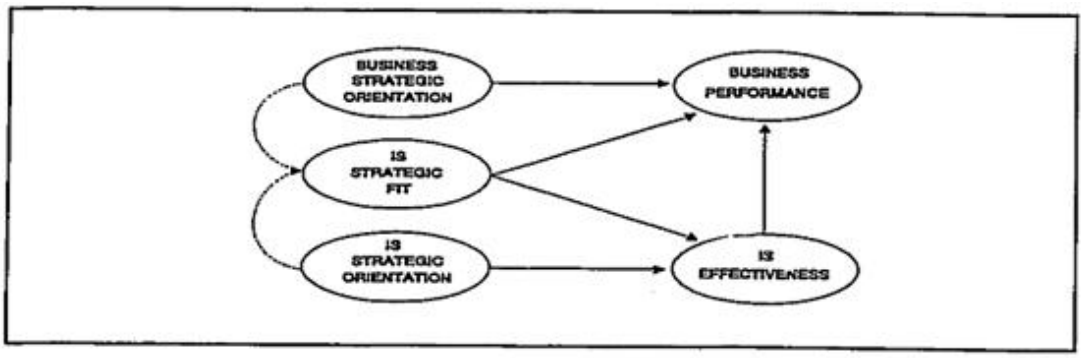

Figure 5 Alignment Model (Chan 1992, p.34)

Chan's model has been widely used with its original way (i.e., small manufacturing firms by Cragg, King, & Hussin (2002)) and with some modified versions as well. For example, Hale and Cragg (1996) use Chan's model to examine alignment in small sized firms. The authors state the model and proposed instruments are valuable in terms of building a measurement on alignment. On the other hand, Byrd, Lewis & Bryan (2006) use the same model in order to examine how Enterprise Wide Information Systems investments as well as the strategic alignment affect performance. The findings reveal performance is positively affected by the synergy between investments in Enterprise Wide Information Systems and strategic alignment where it is used as a moderator between ES investment and business performance. The more aligned firms the more benefits organizations will get (Byrd et al. 2006).

2.2.6.4 Weill's Alignment Model

Weill (Weill, 1992; Weill, 1990) developed a model that examines the relationship between performance goals of an organization, business strategy, ES strategy, and firm

performance by studying sixty-eight manufacturing firms. He also studies how investments in ES affect the firm's performance related to goals and business strategy. The author develops an instrument that focuses on performance from investment point of view and examines strategy by using Porter's (Porter, 1980) typology based on cost leadership, differentiation, and niche concentration strategy. He uses sales growth, profit, return on assets, cost minimization, and technical excellence in order to measure organization performance (see Figure 6).

Several researchers have examined the model developed by Weill empirically and theoretically that has lead to the development of more comprehensive models and studies as mentioned during the discussion of evolution of alignment.

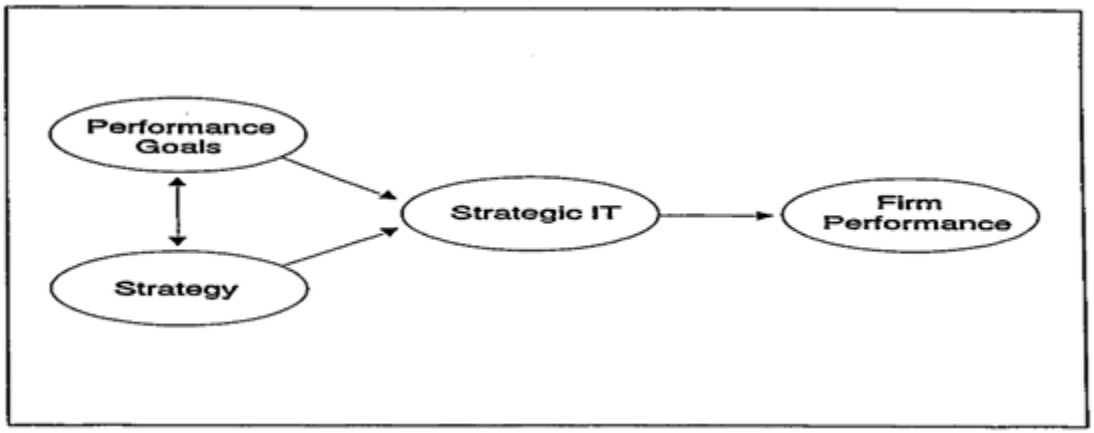

Figure 6 Alignment Model (Weill, 1990)

2.2.6.5 Benbya and McKelvey's Co-evolutionary ES Alignment Model

Benbya & McKelvey (2006) develop a framework where the authors examine alignment and its emergent nature from co-evolutionary and complexity theory perspectives. These authors consider alignment with the perspective of co-evolution theory as a sequence of three level adjustments: (1) individual; (2) operational; and (3) strategic. In the strategic dimension, the focus was on interaction of business and ES strategies. The relationship between ES and business departments through shared understanding and communication such as responsibilities, decision-making rights, communication among group members, and values are examined in the operational dimension. Finally the third dimension includes the relationships between ES, ES infrastructure, and users. The authors also examine the principles of adaptation and scale-free

dynamics as enablers of alignment. They proposed that: (a) ES alignment is the domain of organizational effectiveness; (b) co-evolutionary dynamics over three dimensions is the domain of ES alignment; (c) McKelvey's (McKelvey, 2004) five 1st Principles is the domain of co-evolution; (d) Nine scale-free dynamics is the domain of McKelvey's 1st Principles; and (e) scale-free dynamics initiate the ES alignment (see Figure 7).

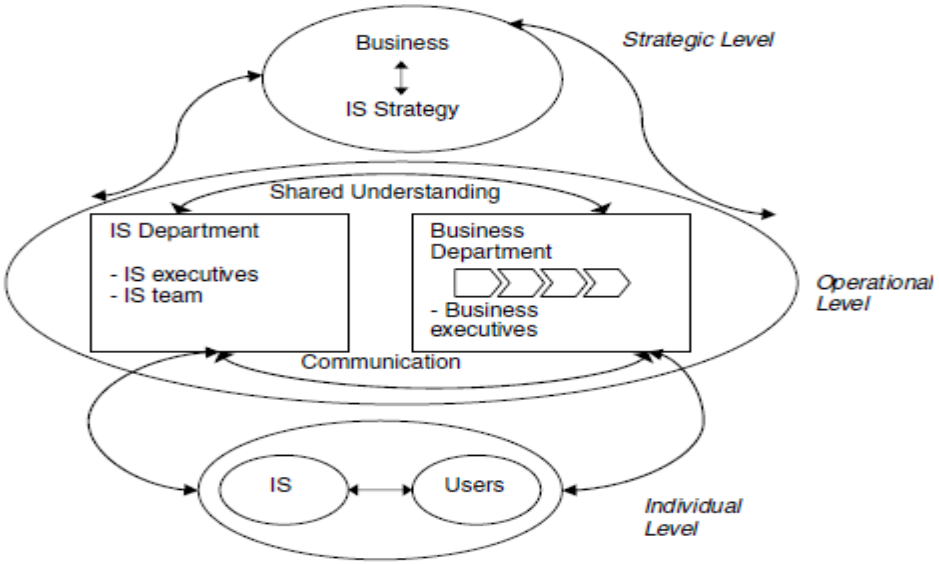

Figure 7 Co-evolutionary ES Alignment (Benbya & McKelvey, 2006, p.288)

2.2.6.6 Alter's Work System

Alter (2002) proposes a "work system" that focuses on understanding, analyzing, and improving organizational systems. The method uses both a static view that is based on "work system framework" and a dynamic view that is based on "work system life cycle model" views for examining the adaptation process for changes. While the elements, opportunities, problems, and possible impacts of changes in a system are defined under the static view, the dynamic view helps to reveal the evolution that takes place over time (Alter, 2002). The framework proposed by the author does not necessarily require an ES domain involvement. In spite of this fact, Jaffar, ElKhatib, & Radaideh (2007) used the model to examine the needs, opportunities, and strategies and processes for both ES and business domain for a specific food (dates) industry.

2.2.6.7 Raffa and Capaldo's ES Process Alignment Model

Raffa & Capaldo (2007) examine alignment of ES from an implementation perspective. The authors propose a process model for alignment. The model deals with implementation process, technology acceptance, roles, activities, and strategies in a three phase approach as part of business and ES alignment. In the first phase, the organization may be forced to adopt a new ES in order to adapt to the change by internal or external drivers such as suppliers, competitors, or regulators. The second phase is the one that the technology and organization are aligned to each other in adaptive cycles. In the third phase, the firms conduct trade-off analysis to assure that alignment is reached after several cycles of adaptation (see Figure 8).

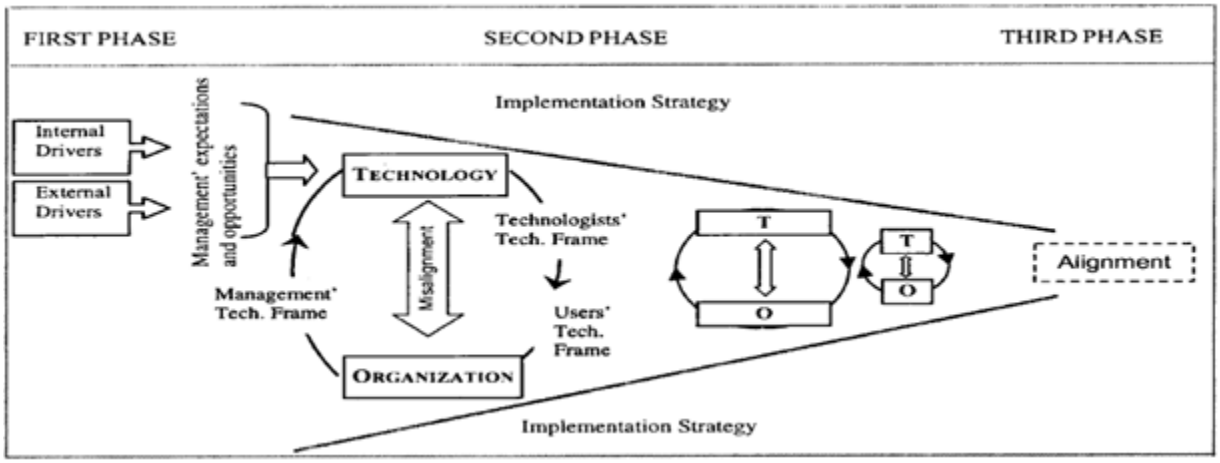

Figure 8 ES Process Alignment (Raffa & Capaldo, 2007, p.17)

2.2.6.8 Reich and Benbasat Framework

Reich & Benbasat (2000; 1996) develop a framework that identifies alignment from social and intellectual dimensions based on a cause and effect relationship. While the intellectual dimension dealt with techniques and methodologies for formulating the strategy specifically for ES and business planning approaches and plans' content from causal perspective, this dimension focuses on the consistency and validity of ES and business objectives from the effect perspective. Social dimensions of the framework were designed to examine factors such as involvement, choice of actors, and communication methods for decision making from causal perspective, and how management of both ES and business units perceive the objectives and plans of others from the effect perspective.

In their later study, Reich & Benbasat (2000) examine the antecedents of alignment. They propose four factors that affect alignment such as knowledge sharing (domain knowledge) among ES and business units, communication among management of units, the way ES and business planning are connected, and implementation results for ES. The effects of these issues allow alignment to be categorized as a short term and long term alignment (Reich & Benbasat, 2000). While examining the enterprise architecture and its effects in business and ES alignment, Gregor, Hart, & Martin (2007) use and extend the model developed by Reich & Benbasat (1996) and Reich & Benbasat (2000). They examine both social and formal mechanisms of alignment and provided empirical support regarding how formal architecture mechanism can be part of the alignment process (see Figure 9).

Reich and Benbasat (Reich & Benbasat, 1996; Reich & Benbasat, 2000) focus on alignment more from the managerial perspective and examine how understanding objectives help measuring the linkage/alignment. This study is worthy while examining alignment from a knowledge management perspective.

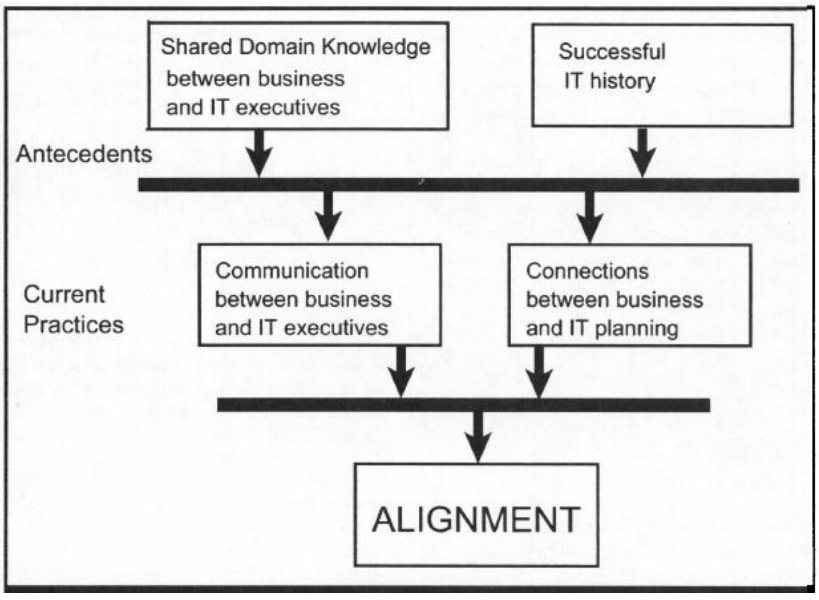

Figure 9 Alignment Model (Reich & Benbasat, 2000, p.85)

2.2.6.9 Sabherwal, Hirschheim, and Goles' Alignment Model

Another framework pertaining to alignment has been developed by Sabherwal et al. (2001). Their study focuses on how alignment between business and ES strategies and structure is achieved. The authors examine alignment from a holistic perspective and viewed dimensions of alignment with relationships among each other. They examine strategic alignment, structural alignment, and cross-dimensional alignment with their specific elements in their framework. The authors accept alignment as being dynamic and with capability of adjusting to changes. Therefore, instead of using a Darwinian model that sees through accelerated evolution, they highlighted the value of the punctuated equilibrium model (Sabherwal et al. 2001). Based on the model, each stable period will be followed by a shorter period where the organization will face revolutionary change. Punctuated equilibrium model would prevent deep effects on strategic ES profile by allowing organizations to make the appropriate strategic and structural arrangements in business and ES domains (Sabherwal et al. 2001). In other words, the authors show that, based on the changes in evolutionary and revolutionary periods, the organization adopts them with different strategies. Additionally, revolutionary periods need to have some combination of five triggers such as environmental shifts, outsiders, low performance, new leadership, and perception transformation (Sabherwal et al. 2001) (see Figure 10).

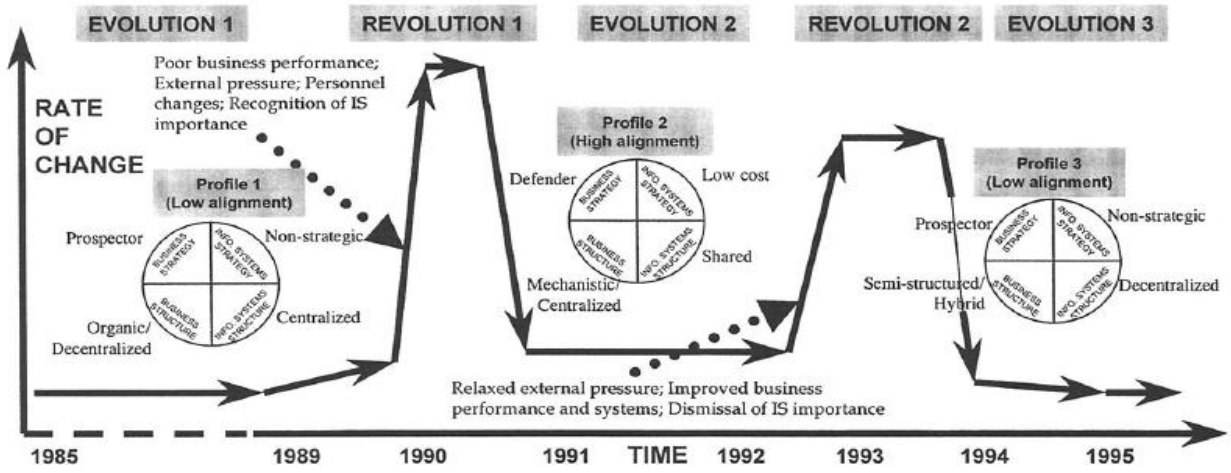

Figure 10 Evolutionary and Revolutionary Periods and Alignment (Sabherwal et al. 2001, p.184) (Adapted with Permission)

2.2.6.10 Baets Model

Baets (1992) presents an approach for achieving alignment by combining the models of MacDonald (1991) Strategic Alignment Process and Parker, Benson, & Trainor (1988) Enterprise Wide Information Model, based on the argument that business strategy is unknown or inadaptable. MacDonald's (1991) model includes the relationships between ES and business strategies, infrastructure, and process as well as effects of buyers and vendors on these components (Chan & Reich, 2007). Baets (1992) argues alignment should be examined from a broader perspective, which should include several factors such as change, implementation, and competition to the model. The model also addresses several needs such as: (1) the need for alignment between ES strategy and business strategy; (2) need for middle management to be involved in ES strategy; (3) need for determining the economic value of ES implementation; (4) need for improving the understanding among middle managers; and (5) need for clarifying the right information for decision making. One of the main differences between SAM and Baets' model is that Baets does not assume members in the organization are aware of the strategy and economic environment unlike SAM (Chan & Reich, 2007).

The advantages of this approach include: (1) allows defining, adapting, or improving an overall strategy even if there is no corporate strategy; (2) improves communication between functions and hierarchical layers; (3) allows the development of shared cultural values within organization; and (4) allows for new knowledge creation (see Figure 11).

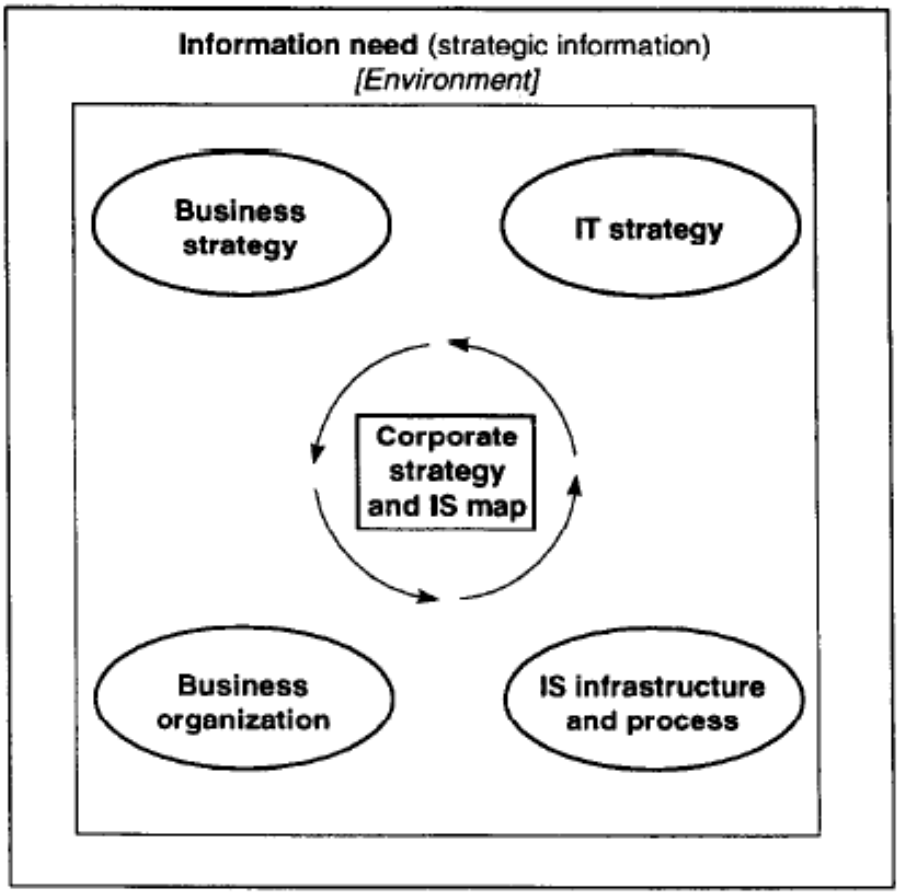

Figure 11 Extended Alignment Model (Baets, 1992, p.207)

2.2.6.11 Current Trends in Alignment Studies

There is a substantial amount of studies in literature regarding alignment of ES and business and business performance (Stoel & Muhana, 2009; Velcu, 2010). In addition to the highly used and cited models of alignment, there are several studies that have been mentioned throughout the literature review chapter. In short, the current trend on alignment studies include examining alignment from process level (Sledgianowski & Luftman, 2005), ontological work aiming to combine several models to provide a more comprehensive approach to alignment phenomena (Plazaola, 2008; Chevez, 2010; Sakka, 2011), examining alignment concept and related constructs with a more detailed approach (Chou and Chang, 2008; Raymond & Croteau, 2009), and examining alignment from dynamic business environment perspective (Street, 2006). In addition, researchers propose and test several models as well. For example, Velcu (2010) examines alignment between ERP strategy and business strategy during implementation of ERP

systems. After the implementation organizations have effects of changed or reengineered business processes. The author states these changes have a positive impact on internal efficiency. Velcu (2010) proposes a model in which strategic alignment and motivation for ERP systems affect the management of the ERP project. Management of the ERP project has direct and indirect effects through changes in business process, on the process benefits of alignment, which leads to improved customer benefits and enhanced financial benefits that are measured through a balanced scorecard approach.

In this research, we have been following the current trend in literature based on the current needs of alignment studies and examine alignment as dynamic process within the dynamic business environment. This study allows researchers or practitioners to measure their alignment level as well as identifying their realized business and ERP strategy, which can change over time (Sabherwal et al. 2001; Street, 2006). We also focus on specific aspects on alignment as Chan and Croteau suggests in different studies and provide an initial set of elements, perspectives, constructs, etc. that need to be considered for ontology studies.

Table 11 Prior Studies about Alignment Models

Authors	Discussion
Henderson & Venkataramanan (1991), Henderson & Venkatraman (1989), Henderson & Venkatraman (1992)	Presented SAM. The model has four domains as: (1) business strategy; (2) ES strategy; (3) organizational infrastructure and processes; and (4) ES infrastructure and processes. Examine alignment as (1) bivariate fit; (2) cross-domain alignment; and (3) strategic alignment. Derivatives of SAM include: Luftman et al. (1993): contributed to transformation of organization. Luftman (1996, 2000): added enablers and inhibitors, and presented Strategic Alignment Maturity Assessment instrument. Smaczny (2001): introduced fusion model Weill and Broadbent (1998): how to support business strategy through investing in IS. Maes (1999), Maes et al. (2000): developed unified framework.
Chan (1992), Sabherwal & Chan (2001)	Examine the relationship between ES strategy, business strategy, and performance. Main focuses of their model are ES strategic alignment, fit between business, and ES strategic orientation, ES effectiveness, and business performance.
Weill (1990), Weill (1992)	The present model examined the relationship between performance goals of an organization, business strategy, ES strategy, and firm performance.
Benbya & McKelvey (2006)	Examine alignment based on coevolutionary and complexity theories. Alignment is a sequence of individual, operational, and strategic adjustments.
Alter (2002)	The model does not require ES domain. The "work system" has both static and dynamic views that examine adaptation process.
Raffa & Capaldo (2007)	Their process model examines alignment based on ES implementation and is limited to only issues regarding implementation.
Reich & Benbasat (1996), Reich & Benbasat (2000)	Examine alignment based on social and intellectual dimensions as well as antecedents of alignment.
Sabherwal et al. (2001)	Examine alignment, strategic, structural and cross-dimensional based on punctuated equilibrium model. According to the authors, alignment occurs in phases, which follows a series of evolutions and revolutions.
Baets (1992)	Combines MacDonald's (1991) Strategic Alignment Process and Parker et al.'s (1988) Enterprise-wide Information Model. Their model allows improving an overall strategy and communication between functions and hierarchical layers; development of shared values; and knowledge management.

Source: The table has been extended from the literature based on Chan (1992), Sabherwal et al. (2001), Peppard & Breu (2003) studies.

2.3 Enterprise Resource Planning Systems

This subsection explains Enterprise Resource Planning (ERP) Systems as how they have evolved, and the phases of ERP research. The subsection concludes with the alignment of ERP systems.

2.3.1 Evolution of ERP

Literature provides several definitions of ERP. For example, Markus, Axline et al. (2000) define ERP systems as "commercial software packages that enable the integration of transactions oriented data and business processes throughout an organization" (p.245). O'Leary (2002) defines ERP as "software that can integrate across multiple functional areas by focusing on processes, rather than the individual functions" (p.100). We define ERP as a strategic business software package that enhances the efficiency and business value of the organization by exchanging real time data and integrating processes among business functions and within the whole organization.

In today's competitive business world, information has gained more and more importance. In addition, access to the "right" information at any desired time as well as capturing, storing, and modifying information has become critical. While there are a number of applications in the market, organizations have become more interested in an application that integrates many of these separate applications/processes used within the whole enterprise. Therefore, organizations have begun selecting and implementing enterprise-wide systems such as Enterprise Resource Planning software. ERP systems promise the integration of back office operations and a flow of information such as financial and accounting, human resource, manufacturing, customer and the like, throughout the company (Davenport, 1998; Verville, 2000). This allows organizations to access the most accurate information from one integrated source.

ERPs are valuable and important for organizations. When understanding the evolution of ERPs it is important to understand these facts. ERPs roots can be traced back to Material Requirement Planning (MRP). MRPs are developed in order to automate the master production schedules for planning and controlling production (Abdinnour-Helm, Lengnick-Hall, &

Lengnick-Hall, 2003; Chen, 2001). Organizations usually faced problems about MRPs, and the majority of these problems were caused by people (Belt, 1979). Managers did not see the link between manufacturing and the competitive strategy (Miller, 1981) as well as the benefits stemming from MRPs. Another disadvantage of MRPs was their limited application areas. For example they did not fully address the needs of organizations about capacity, space, capital, engineering change, and cost (Huang, David, David, & Yurong, 2003).

In the mid 70s, MRP was extended from a simple material planning and control tool to a company-wide system to become Manufacturing Resource Planning (MRP II). These systems are more sophisticated compared to MRPs in terms of technology and capabilities. They include separate modules for each type of process or function (Abdinnour-Helm et al. 2003). These capabilities allowed easier integration of systems (McGaughey & Gunasekaran, 2007). One of the main objectives of MRP II was to automate business processes in an organization. Although some of these automation and integration of systems/processes were located separately, they were still within the company (McGaughey & Gunasekaran, 2007). Early trend was single site implementations. This trend has shifted towards multi-site and also even integration of global operations (Ghosh, 2002). Therefore, MRP II was not fully satisfying this need.

While the benefits of such systems attracted more and more attention, several production control systems such as Just-in-Time (JIT) and Theory of Constraints (TOC) were developed after MRP II. Abdinnour-Helm et al. (2003) state that ERP is an extension of MRP II that promises to address the similar needs. An advantage of ERP over MRP II is it can integrate business processes and ES concepts so the synergy contributes to efficiency of organization and business (Al-Mashari, Al-Mudimigh, & Zairi, 2003; Chung & Snyder, 1999). Ptak & Schragenheim (2000) state ERP is not a different name for MRP II but it is a "next level of logical sophistication" within an evolution. The main difference between MRP II and ERP stems from the point of focus for planning and scheduling. While the focus is only on internal resources for MRP II, the focus of ERP includes suppliers' resources, too (Chen, 2001).

The journey of ERP is not finished yet. It is still evolving and moving towards an Internet-based architecture (McGaughey & Gunasekaran, 2007). Gupta (2000) mentions ERP has

evolved from MRP and this evolution is still continuing parallel to developments in technology and needs. The authors also state in the future, ERPs will focus more on web-based applications. ERP will benefit from all the advantages of the Internet such as browsing the product online, checking availability, etc. (Gupta, 2000). Outsourcing programs to small and midsized companies will be another trend that ERP vendors might focus on (Gupta, 2000).

2.3.2 Enterprise Resource Planning Overview

Organizations usually make huge investments on ERP by hoping that ERP will: (a) reduce the ES and support costs in the long run; (b) reduce the dependency on the MIS department with the real time data; (c) simplify business processes and their integration in different business units; (d) easily exchange the information and decrease the related cost; (d) ensure synergy and enhance performance in the organization (Holsapple & Sena, 2003; Lonzinsky, 1998).

As the nature of ERPs is to support business functions by integrating various information from different departments there are numerous benefits of ERPs for organizations mentioned in literature (Al-Mashari et al. 2003; Calisir & Calisir, 2004; Gupta, 2000; Hsu & Chen, 2004; Koch, Slater, & Baatz, 1999; Light, 2001; Shang & Seddon, 2000). These benefits would vary based on the strategic objectives of an organization. Therefore categorizing these benefits would help to highlight the benefits of ERP in a better way (Hsu & Chen, 2004).

The benefits are also grouped under several categories by different researchers (see Table 12). For example, among those, Hsu & Chen (2004) and Poston and Grabski (2000) categorize benefits of ERPs as tangible and intangible. Some of tangible benefits of ERPs include accurate market forecasting, enhancing manufacturing flexibility, product development cycle and product quality, decreasing inventory cost, order cycle, supporting production capacity planning, personnel, technology costs, procurement, maintenance, and inventory reduction. Intangible benefits include better resource allocation, enhanced communication, information flow, response time to inquiries, service quality and customer satisfaction, business performance, supply/demand chain, standardization, improved process, and information integration.

Shang & Seddon (2000) propose a framework to examine the benefits of ERP systems. Their framework includes five main dimensions with several sub-dimensions of each. The operational dimension deals with cost reduction, enhancing quality, productivity, and customer services, and cycle time reduction. The managerial dimension includes the benefits such as enhancing performance, decision making capability, and better resource management. Strategic benefits include building cost leadership, innovations, and linkages with other parties, and supporting business growth and alliance. Benefits regarding ES infrastructure include increased capacity, reduced cost of ES, and increase flexibility of business. Finally organization benefits of ERPs include empowerment, supporting organizational change and business learning, and creating common visions.

Markus (Markus, Axline, Petrie, & Tanis, 2000; Markus, Tanis, & Fenema, 2000) state the main objective of ERP systems is the integration. They integrate data with different business units in order to price the products, prepare financial statements, and manage resources in an efficient way. Based on these views, ERP is multi-functional, integrated, and modular software, respectively. In addition, Davenport (2000) states ERP has strategic value to the organizations. While organizations use ERP as a tactical tool first, in time they recognize the strategic importance of the software regarding how ERP enhances their business values.

As we have mentioned above, ERP systems are different from traditional software systems. More precisely, ERP systems are strategic tools for organizations (Davenport, 2000b). Literature mentions several criteria for being considered as strategic. Porter's (1980) study was one of the first studies that examined ES from the strategic point of view. Several other works followed his footsteps and examined further criteria of being strategic. Loukis et al. (2010) mentions several of these criteria. For example, if an application or system is used "to change the products, services, markets or production economics of an industry, to affect the buyers and suppliers of the enterprise, to prevent customers from buying products and services from competitors, to preclude new competitors, to alter the degree of rivalry, or to support one of the Porter's generic strategies (differentiation, cost leadership and focus)" (Loukis et al. 2010, p.44), have impact on internal operations and functions (Loukis et al. 2010; Benjamin, Rockart, Scott Morton, & Wyman, 1984), help organizations to distinguish themselves by their products and

services (Loukis et al. 2010; Ives & Learnmonth, 1984), improve the organization's relationships with other parties such as customer, suppliers, competitors, etc. (Loukis et al. 2010; Wiseman, 1985), and used in at least one of the primary activities (inbound logistics, operations, outbound logistics, marketing and sales, after-sales support and services) or one of the support activities (human resources management, technology development, infrastructure management, procurement) of the value chain (Porter & Millar, 1985)" (Loukis et al. 2010, p.44), then it is considered to be strategic.

Table 12 Studies about Benefits and Advantages of ERP Software

Benefits of ERP System	Authors
Tangible: Accurate market forecast, enhancing manufacturing flexibility, product development cycle and product quality, decreasing inventory cost, order cycle, supporting production capacity planning, personnel, cost of technology, procurement, maintenance, and inventory reduction. Intangible: Better resource allocation, enhanced communication, information flow, response time to inquiries, service quality and customer satisfaction, business performance, supply/demand chain, standardization, improved process, and information integration.	Hsu & Chen (2004), Poston & Grabski (2000)
Operational dimension: Cost reduction, enhancing quality, productivity, and customer services, and cycle time reduction. Managerial dimension: Enhancing performance, decision making capability, and better resource management. Strategic dimension: Building cost leadership, innovations, and linkages with other parties, and supporting business growth and alliance. ES infrastructure dimension: Increased capacity, reduced cost of ES, and increased flexibility of business. Organization dimension: Empowerment, supporting organizational change and business learning, and creating common visions.	Shang & Seddon (2000)
Integrating financial and customer order information, reducing inventory, and standardizing and speeding up manufacturing and HR processes.	Koch et al. (1999)
Process improvement, data visibility, reduced operating cost, use of common platform by different departments, enhanced decision making capabilities, and customer response.	Ross & Vitale (2000)
Improved query capability and integration plans, adaptability in realigning businesses, better disaster recovery management.	Verville & Halingten (2002)
Reduction in inventory, administrative, and operational costs, and improved schedule compliance.	Jutras (2007)
Operational benefits: Improving process efficiency through cost reduction, improved productivity, and better address customer needs (i.e., reduced response time, errors). Tactical benefits: Enhanced decision making capabilities through having more employees involved in decision making, increased revenue, customer satisfaction. Strategic benefits: Enhanced capability to adapt changes in environment (i.e., technology, regulations, etc.).	Chand, Hachey, Hunton, Owhoso, & Vasudevan (2005)

Irani & Love (2001) and Ng, Gable, & Chan (2002) state that ERP systems help companies to have the required infrastructure and technology in order to adapt and advance their businesses. According to Koch et al. (1999) the reasons why organizations buy ERP include benefits such as integrating financial and customer order information, reducing inventory, and standardizing and speeding up manufacturing and HR processes. According to Vitale (Ross & Vitale, 2000; Vitale, Ives, & Beath, 1986) the motivational reasons behind the ERP

implementation are process improvement, data visibility, reduced operating cost, use of common platform by different departments, enhanced decision making capabilities, and customer response. According to Verville & Halingten (2002) some other benefits include improved query capability and integration plans, adaptability in realigning businesses, better disaster recovery management, etc.

Findings of Mabert, Soni, & Venkataramanan (2003) reveal that regardless of size, ERP provides benefits to all companies. Although the cost is high for ERP implementation (Tarn, Yen, & Beaumont, 2002), tangible and intangible benefits can balance these costs. In addition to that, by simplifying and standardizing the processes and systems, ERPs allow easier upgrades for the future. Aberdeen Group 2007 report by Jutras (2007) also reveal some benefits of ERP software such as reduction in inventory, administrative, and operational costs, and improved schedule compliance.

Gupta (2000) discusses the advantages and disadvantages of ERP systems. Some of the advantages include reduced inaccuracies for planning, improved decision making and process time, providing additional options such as Internet, online communication among suppliers and customers, and tailored implementation. ERP systems provide benefits by integrating various functions; however, they are still easy to use. In addition, Poston & Grabski (2001) examine how ERP systems affect firm performance. Their study reveals that ERP enhances firm performance by reducing the costs (ratio of cost of goods sold to revenues) and enhancing decision making process. The authors also explain the main benefits of adopting an ERP system.

The benefits and advantages of ERPs are well-recognized and users of ERP have increased around the world. Different software packages have been developed in the market in order to address the increasing and different needs. According to AMR Research's 2008 report, the revenue for ERP applications was $34.4 billion in 2007 and $38.2 billion in 2008. They estimated the revenues of ERP applications would increase over the years and 2009 revenues would be $41.2 billion, 2010 revenues would be $46.2 billion, 2011 revenues will be $50.8 billion, and 2012 revenues will reach to $55.9 billion. The report also states the main ERP vendors are SAP with $14,033 million, Oracle with $7,853 million, Infor with $2,208 million,

Microsoft with $1,215 million, Lawson with $810 million, Activant with $295 million, QAD with $263 million, and CDC Software with $245 million revenues (see Figure 12 and 13).

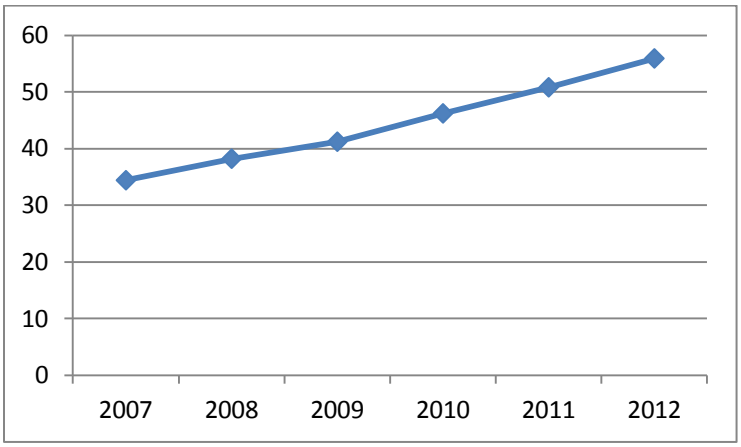

Figure 12 Current and Estimated ERP Revenues (in billion dollars) (AMR Research 2008)

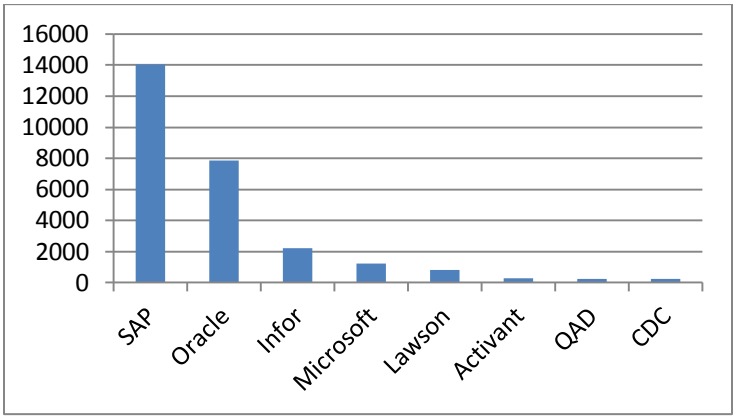

Figure 13 ERP Vendors and their Revenues (in million dollars) (AMR Research 2008)

In some cases, organizations may not be willing to adopt ERP software. One reason may be the fit between organization needs and the products available in the market (M. Lynne Markus & Tanis, 2000). According to Markus and Tanis (2000) criteria such as type of decision making (decentralized), growth, and strategic flexibility may lead organizations not to adopt ERP systems. Other reasons for non-adoption of ERP include the number of alternative ways for system integration, cost, and resistance to change (Markus & Tanis, 2000).

Costs and difficulties of ERPs are also well-recognized by researchers and practitioners (see Table 13). According to Gupta (2000) and Ghosh (2002), the organizational resistance from

end users and functional area managers and conflicts in interests may be obstacles for an organization to implement a new ERP system. Also the changeover may take a longer time than anticipated and this may cause an increase in the cost. Previous errors in data may be carried to the new system. In addition, maintenance also costs are high for the organization and may take a lot of time (Gupta, 2000). Finding experienced implementers is also another challenge for organizations (Ghosh, 2002). Soh, Kien, & Tay-Yap (2000) mention the cultural misfit regarding ERP. These huge and global software packages are not fully able to fit with the local laws and practices (Rolland & Prakash, 2000). ERPs also require a high amount of internal resources, and also the alignment procedure to requirements is not easy (Rolland & Prakash, 2000).

The cost of ERPs to companies is high. Companies need to make huge investments for their ERP under different categories. The categories of costs identified by Meta Group are related to software, hardware, and service (customization, maintenance, integration, data conversion, testing and training). Koch et al. (1999) state the average cost of ownership of an ERP system with the hardware, software, and staff costs reaches $15 million (ranging between $400,000 and $300 million based on a 63 company survey). A later report by Jutras (2007) from Aberdeen Group focuses on the cost based on the company size. Their report has revealed that companies with annual revenues less than $50 million spend an average around $13,854 per user (average number of users is 38). While the largest companies with over $5 billion annual revenues spend $2,068 per user (average number of users is 3365), companies with revenues between $100 million and $250 million spend the highest per user (average number of users is 195) fee, $18,175 for ERP software.

Koch et al. (1999) and Soh et al. (2000) argue there are also some hidden costs for ERPs. These hidden costs include training of staff, consultancy cost (excluding installation consultant fee), integration of the software after purchase and related testing, customization, data conversion from the old system, data analysis that will most likely require a data warehouse, changing roles in the organizations among employees, the ongoing work of implementation teams unlike other software projects, waiting for return on investment (ROI) that does not come right after the installation, and post-ERP depression in the organization.

Table 13 Studies about Difficulties, Concerns, and Possible Costs of ERP Software

Discussion	Authors
Organizational resistance from end users, management, conflicts in interests, increase in cost due to unexpected delays in changeover time, carried previous errors from old system, finding experienced implementers.	Gupta (2000), Ghosh (2002)
Cultural misfit.	Soh et al. (2000)
Difficulties with fit with the local laws and practices, requires high amount of internal resources, requires alignment.	Rolland & Prakash (2000)
Training of staff, consultancy, integration and testing, customization, data conversion, data analysis and data warehouse, changing roles among employees, implementation costs, delayed return on investment (ROI), and post-ERP depression.	Koch et al. (1999), Soh et al. (2000)
Need-product fit, available alternative for integration, cost, resistance to change, concerns about strategic flexibility, decision making style, and growth.	Markus & Tanis, (2000)

2.3.3 Phases of ERP Research

There are few studies that provide an overall view of phases of ERP research. Esteves & Pastor (2001) developed a framework, called ERP Life Cycle, involving four dimensions and six phases. The dimensions are named as change management, people, process, and product dimensions. Product dimension of this framework deals with functionality that must exist while considering alignment ERP with business strategy (Esteves & Pastor, 2001). Process dimension includes the re-engineering processes for the organization to adapt new business models. Human resources, skills, roles, and the ways to adapt the new organizational culture and structure are the main topics covered in the people dimension. Change management dimension deals with issues regarding acceptance and how ready the system is (Esteves & Pastor, 2001). On the other hand, the phase of ERP research is examined under adoption decision, acquisition, implementation, use and maintenance, evolution, and retirement phases (Esteves & Pastor, 2001). Verville (2000) examines ERP under only three main phases with a broader overlook for each phase: pre-implementation, implementation, and post-implementation. In this study, we will follow Verville's (2000) approach that is highly accepted and examine ERP under three phases: pre-implementation, implementation, and post-implementation. While pre-implementation involves acquisition, or selection, the post-implementation phase involves maintenance and evolution.

2.3.3.1 Pre-Implementation

Pre-implementation includes the adoption decision and acquisition phases. During the adoption decision phase, managers decide whether the organization needs a new ERP system to

improve the organizational strategy or not. Important concepts managers deal with include defining the requirements, goals, business challenges, and the ways adoption of the new ERP system will improve at business and organization levels (Esteves & Pastor, 1999). Flexibility assurance, which deals with the way the system is reconfigurable to new business models and processes (Al-Mashari, 2002) and standardization are critical concerns in ERP adoption.

ERP adoption has been examined from several perspectives in literature. The common themes of ERP adoption research are generally the ways ERP systems are adopted, the risks, and pros and cons of adopting. While some studies just focus on specific aspects of ERP adoption, several studies include comparisons among different vendors (Esteves & Bohorquez, 2007). Light, Holland, & Wills (2001) examine the differences based on a single vendor. Several studies also examine the user side of adoption. Bagchi, Kanungo, & Dasgupta (2003) examine the user participation and involvement by extending the theory of reasoned action. Beard & Sumner (2004) examine whether adopting an ERP really provides competitive advantage to the companies and allows sustaining it in an environment where many organizations follow similar approaches or paths, from a resource-based approach. The authors also examine the mobility of the ERP system, and whether the organization exploits the full potential of their system compared to other organizations. He (2004) also uses resourced-based approach to examine challenges on ERP adoption in China.

Buonanno et al. (2005) examine the factors that have effects on ERP adoption. They hypothesize that business factors such as company size, market area, group memberships, availability of branch offices, diversification level, functional extension degree, and organizational change factors such as the size of planned changed have effects on ERP adoption. While the hypothesis regarding company size, and size of planned change were verified, hypothesis regarding the effects of group memberships, market area, availability of branch offices, diversification, functional extension on ERP adoption were rejected.

2.3.3.1.1 ERP Adoption Reasons

Reasons of adopting ERP have been examined broadly in literature. Benders, Batenburg, & van der Blonk (2006) discuss some of these reasons as: (1) information integration; (2)

following the trend; (3) pressure from either ES department or head office, (4) follow the competitors; (5) internal political reasons, influencing from media or consultants; and (6) external pressure from clients. According to (Charalambos & Sylvia, 2004) reducing costs and cycle times, and increasing customer satisfaction are among the reasons of adopting ERP. Chand et al. 2005 group the ERP adoption reasons as: (1) technical ones such as reducing outsourcing for maintenance, eliminating data entry and reducing errors, reducing operating costs and software maintenance burden, improving ES architecture, and integrating applications; and (2) business reasons such as allowing business growth, providing multi-language capability and integrated multi-currency ES support, enhanced business processes, standardized procedures, reduced administrative expenses, improving decision support, etc. With a similar categorization, Markus & Tanis (2000) distinguish the differences between small companies/simple structures and large companies/complex structures in terms of business and technical aspects. According to the authors, one of the main differences between small and large organizations regarding technical reasons is the fact large organizations require multiple similar systems for consolidating (i.e., general ledger packages). The additional business reasons for large organizations include better financial consolidation, single common interface to customers, and worldwide "available to promise capability" (Markus & Tanis, 2000). For small companies, while technical reasons of ERP adoption include reducing software maintenance cost via outsourcing, integrating applications, reducing operating costs, etc., business reasons include eliminating errors and delays for orders, reducing operating costs, business process improvement, etc. (Markus & Tanis, 2000).

2.3.3.1.2 ERP Adoption Models

Aladwani (2001) proposes a model to be tested empirically regarding successful ERP adoption. This model shows factors such as management support, benefits of ERP, impacts of ERP on quality, etc. have impact on ERP adoption (see Figure 14).

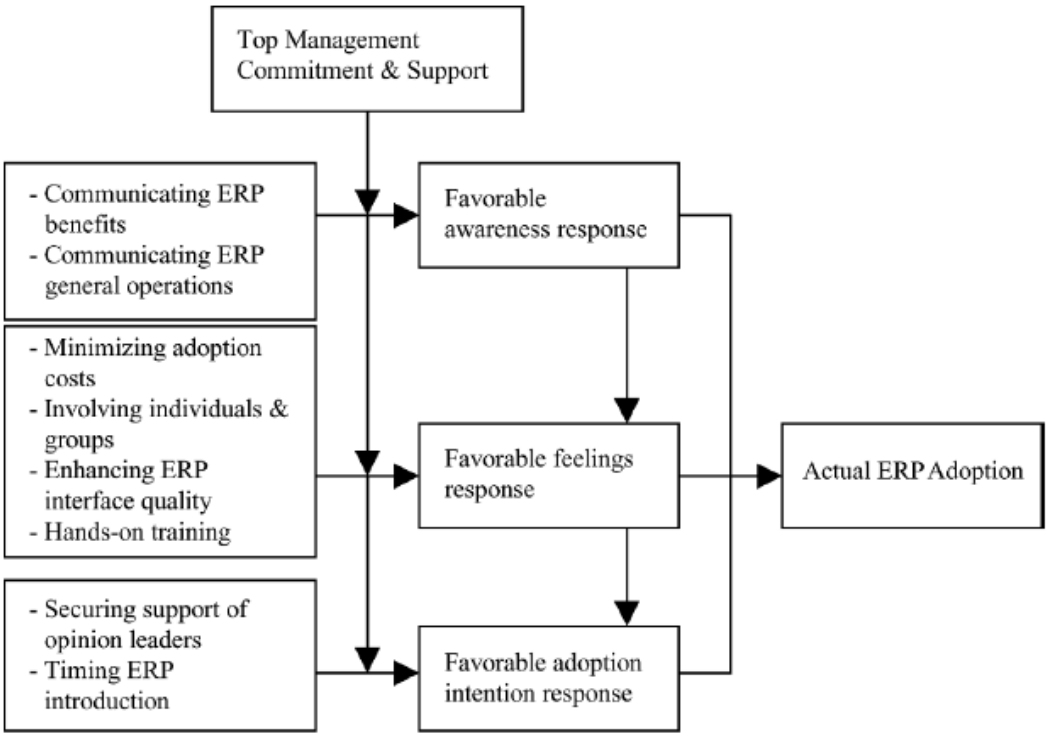

Figure 14 A Model for ERP Adoption (Aladwani, 2001, p.54)

Tan & Pan (2002) identify a success framework for ERP systems adoption. This framework differentiates success themes under three areas: infrastructure success, info-structure success, and knowledge success. According to the author, infrastructure success deals with project success (ERP selection, scope, training, etc.) and system quality (system usability, software updates, data scalability, etc.). Info-structure success deals with information quality (i.e., ability to do real time transaction), perceived usefulness (i.e., information sharing), and user satisfaction. Knowledge success deals with knowledge transfer (knowledge conflicts, best practices, change management, etc.) (Tan & Pan, 2002). The perceived benefits and strategic impacts of benefits of ERP adoption increases from infrastructure to knowledge success as well as from an internal to a more external orientation (see Figure 15).

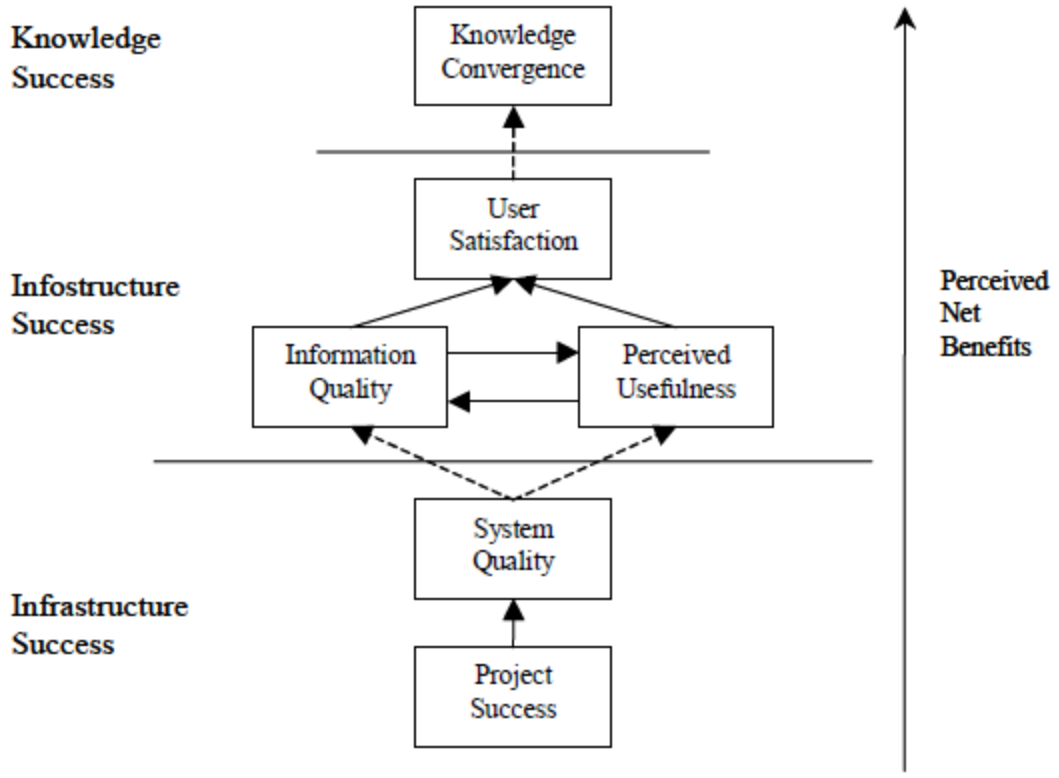

Figure 15 Framework for ERP Adoption Success (Excerpted from ERP Success: The Search for a Comprehensive Framework by Tan and Pan, 2000)

2.3.3.1.3 Acquisition of ERP

In case organizations decide adopting ERP, the next stage is the acquisition of ERP system. Acquisition is considered to be a management issue (Kumar, Maheshwari, & Kumar, 2003). The main objective in this phase is to find a product that matches with the requirements (Esteves & Bohorquez, 2007).

Selecting the most suitable ERP solution is critical in ERP success (Somers & Nelson, 2001). There are several studies examining the criteria for acquisition of ERP. For example, Baki & Cakar (2005) identify 15 criteria that are important for firms. First criterion is the functionality of the software. The authors examine functionality based on comprehensiveness. Acquired ERP should include enough modules (possible more modules for future use) so it can address the organization's requirements. A second criterion, technical criteria deals with whether the ERP vendor follows the latest trend in ES. Third criterion for ERP acquisition is the cost. Organizations need to consider all types of costs such as the hardware, software, consultancy,

training, implementation costs (Mabert, Soni, & Venkaturamunan, 2003b), maintenance, and upgrades (Baki & Cakar, 2005). Sometimes ongoing costs may exceed the initial costs of software; organizations need to be careful about service and support, which is the fourth criterion to consider during selection process. Vendor related factors such as reputation (Kumar et al. 2003), strength in the market, financial stability, and even vision of the vendor are among important issues to be considered for acquisition (Baki & Cakar, 2005; Verville & Halingten, 2002). System reliability is considered as the fifth important criterion for the selection process (Kumar et al. 2003). While selecting a system, companies should consider how long the vendor has been in market, market position of the vendor (i.e., reputation), and how satisfied the customers are about the vendor. The amount of references regarding success projects for the vendor is also a plus to consider during selection process. Another criterion should be related to compatibility of the software with other systems. Since a company should use more than one application to address its needs, the management should consider how compatible or easy to integrate with other systems, and how well it fits with organizational structure. Although organizations need minor customizations, this issue should be considered during acquisition (Baki & Cakar, 2005; Mabert et al. 2003b). Since the real benefit of ERP is the level of integration the software provides, cross-module integration needs to be considered in order to avoid negative effects on effectiveness of the system (Kumar et al. 2003). Baki & Cakar (2005) and Mabert et al. (2003b) state that implementation time and scope are also important for the selection process. Domain knowledge of the vendor as well as the effectiveness of methodology (in terms of required and unnecessary activities, since they will affect the amount of change in the organization) that vendor suggests should be considered during the acquisition. The last criterion that Baki & Cakar (2005) mention is consultancy. Companies should take the experience, comprehensive knowledge, analysis capability, etc. factors into consideration while selecting the consultant (Baki & Cakar, 2005; Somers & Nelson, 2001).

Bernroider and Koch (2001) examine ERP acquisition in small/medium and large organizations and how the characteristics differ based on the size of organizations. The authors identify twenty-nine criteria for decision making. Their results indicate organization size has an effect on decision making about ERP acquisition. For example, while adaptability of software, support, and customer and supplier needs were ranked highest for small companies, quality of

support and market position of vendor ranked highest for larger organizations. Another research by Rao (2000) identifies ERP acquisition criteria as affordability, domain knowledge of suppliers, local support, technically upgradable, and use of latest technology.

Verville, Bernadas, & Halingten (2005) summarize ten critical success factors for ERP acquisition. These factors include: planned and structured process, rigorous process, definition of all the requirements, establishment of selection and evaluation criteria, accurate information, clear and unambiguous authority, carefully selection of the acquisition team members, partnership approach, user participation, and user buy-in.

2.3.3.1.4 Frameworks and Models for ERP Acquisition

Wei & Wang (2004) and Wei, Chien, & Wang (2004) propose a comprehensive framework that can be used for selecting an ERP. The steps in the proposed framework are as follows (Wei & Wang, 2004):

1. *"Form a project team and conduct the business process re-engineering (BPR).*
2. *Collect all possible information about ERP vendors and systems. Filter out unqualified vendors.*
3. *Establish the attribute hierarchy and assign weights to the attributes.*
4. *Interview vendors and collect detailed information.*
5. *Analyze the data obtained from the external professional reports to obtain the objective ERP suitability.*
6. *Assign subjective ratings to the ERP projects on the basis of data acquired in interviews to calculate the subjective ERP suitability.*
7. *Combine the evaluations of both data sources and aggregate the decision-making assessments to determine the final fuzzy ERP suitability.*
8. *Utilize the fuzzy integral value ranking method to obtain the rank of each ERP project.*
9. *Analyze the results of indices λ and k. Observe the change in the final ERP suitability and the final ranking value or evaluating the system with AHP method.*
10. *Select the ERP project with the maximum ranking value.*
11. *Finalizing the decision after discussion.*
12. *Implement the selected ERP project"* (p.162).

The benefits of this stepwise framework include: (1) providing a simple and stepwise procedure for decision makers to be able to select an ERP project; (2) providing a simple method that allows users to integrate personal opinions and expert comments; (3) allowing user to set the priorities for decision making.

Wei et al. (2005) discuss different methodologies for selection such as mathematical optimization, scoring, ranking, and multi-criteria decision making. They also propose an AHP-based approach for the acquisition. This method basically helps in decision making for ERP acquisition by assigning priorities to alternatives and weights (Wei et al. 2005). AHP hierarchy has four levels. The first level states the "strategic objective", which is ERP acquisition. The second level includes two "main objectives" such as system related goals in order to choose "most appropriate system" and vendor related goals such as choosing the "best vendor" available. The third level includes the attributes related to the main goals. These attributes regarding system factors, as the author names, are total cost (in terms of price, maintenance cost, consultant expenses, and infrastructure costs), functionality (in terms of module completion, function fitness, and security), flexibility (in terms of ease of integration, ease of in-house development, and upgradability), user friendliness (in terms of ease of learning and operation), reliability (in terms of stability, and recoverability) and regarding vendor factors are reputation (in terms of financial condition, scale of vendor, and market share), technical capability (in terms of R&D capability, technical support capability, and implementation ability), and service (in terms of warranties, consultant service, training, and service speed). The final level indicates the different ERP systems that are available as alternatives. This framework allows users to identify the criteria to acquire ERP. This framework also allows organizations to: (a) see the different objectives in different levels; (b) decompose the complex elements of ERP acquisition into smaller and manageable attributes; (c) adapt to additional attributes for decision making with its expandable structure; and (d) adjust the attributes according to strategies systematically (Wei et al. 2005) (see Figure 16).

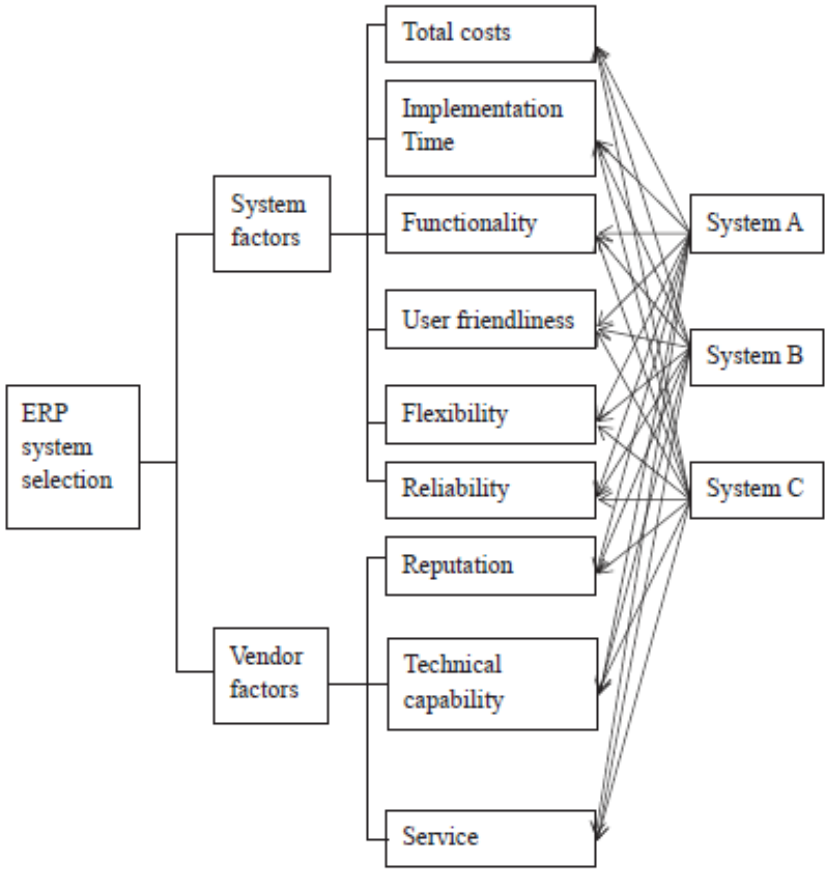

Figure 16 AHP Hierarchy (Wei et al. 2005, p.57)

Verville & Halingten (Verville & Halingten, 2003a; Verville & Halingten, 2003b) examine acquisition process under six stages that are distinct, interrelated and iterative: Within the planning process, main tasks include identifying the dimensions, complexities, risks, and uncertainties regarding the buying process and the software. The authors identify seven categories of the planning process as: (a) forming acquisition teams; (b) developing strategies of acquisition; (c) defining requirements; (d) determining selection and evaluation criteria (i.e., customization, interfaces, scalability of system, performance, etc.); (e) acquisition issues; (f) analysis of marketplace; and (g) deliverables. The second stage is the information search process. Authors define two elements under this stage as information screening and information sources where the objective is to find the key factors of information (i.e., credibility, type, reliability, references, etc.). The main objective of the selection process, the third stage, is two-fold: evaluating the Request for Proposal (RFP) responses and short listing vendors and/or technologies. The evaluation process includes three areas: vendor evaluation, functional

evaluation, and technical evaluation (Verville & Halingten, 2003a; Verville & Halingten, 2003b; Verville, 2000). Examples of vendor evaluation criteria include financial strength, market share, annual growth rate, customer support, reputation, vision, cost, training, quality of proposal, etc. (Verville, 2000). Functional evaluation criteria include customization, ease of use, interface, global business requirement, etc. (Verville, 2000). Alternatively, some examples of technical evaluation include system architecture, database and solution integrations, performance, security, etc. (Verville, 2000). Fifth stage, choice process is the end product of the evaluation process. The final stage; the negotiations process has two components: business and legal. In addition, each process can be iterative and recursive (except choice), embedded, and simultaneous. There is a flow of information among each phase (Verville & A. Halingten, 2003b). This model can be used by managers for the acquisition of complex package software (Verville & Halingten, 2003b) (see Figure 17).

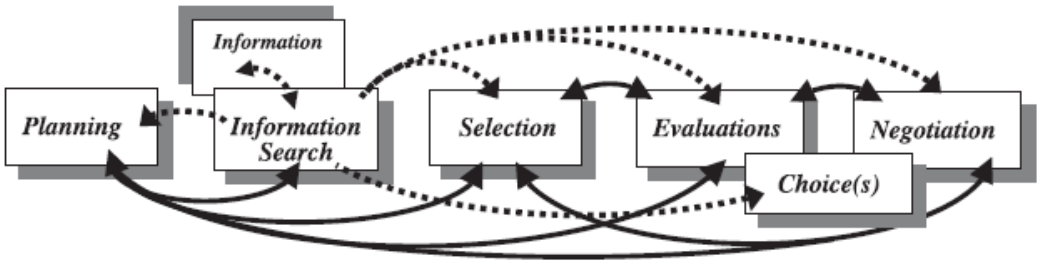

Figure 17 Model of ERP Acquisition Process (Verville and Halingten, 2003, p.598)

Ravarini et al. (2000) propose a framework for evaluating ERP acquisition in SMEs. The framework is composed of four sections: (1) simplified approach; (2) traditional approach; (3) enterprise system check-up; and (4) Business Process Reengineering (BPR). In first position, organizations do not redesign their business processes because of high complexity of their processes. In second position, business complexity is still high and organizations prefer redesigning their business processes. In third position, business complexity is low and ES managers prefer reducing dependency to other software. With this purpose in mind ES managers would focus on existing applications and how effective and adjustable they are with current strategies. In the fourth position, organizations prefer redesigning their business processes in spite of the low level of business complexity. According to the authors, acquisition affects the performance of business processes as well as the ways to conduct business. The transition can be

small or big, ranging from local automation of independent procedures to redefinition of company boundaries through internal integration (in order to create competitive advantage), BPR (partial or full), and business network design (Ravarini et al. 2000) (see Figure 18).

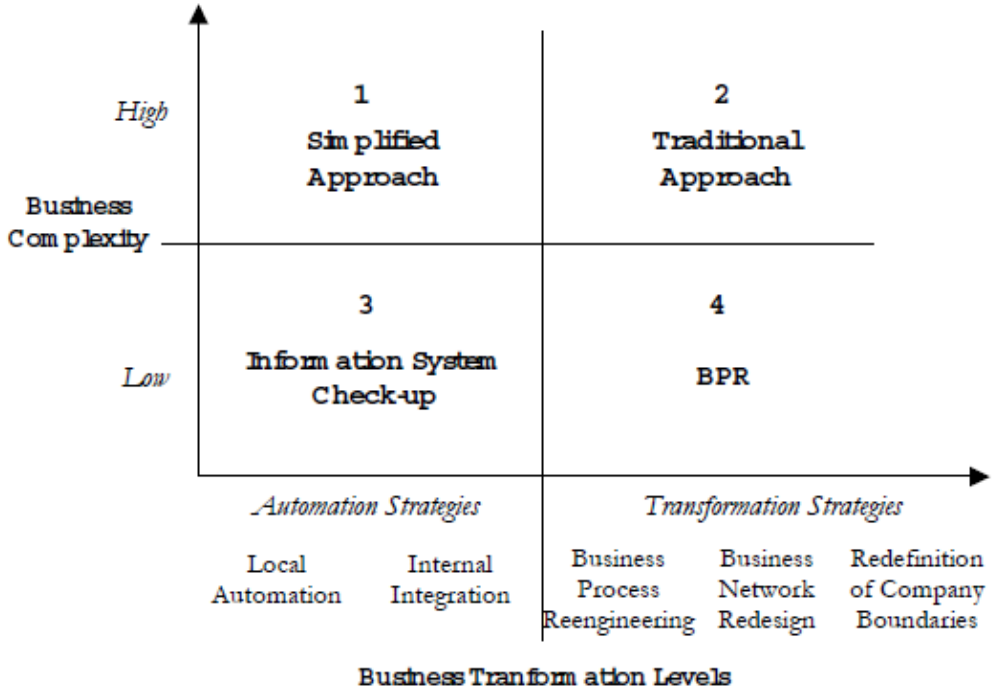

Figure 18 Framework for Evaluating ERP Acquisition within SMEs (Ravarini et al. 2000)

In addition, Umble et al. (2003) suggest several steps to form an ERP acquisition process: (a) defining a vision by organization's objectives and strategy as well as establishing cross-functional teams; (b) building a function list by teams of experienced individuals; (c) developing a list of candidate software through search, interviews, etc; (d) eliminating the candidate to four to six serious candidates by conducting preliminary analysis; (e) creating the request for proposal (RFP); (f) reviewing the proposals and requesting additional information if required; (g) identifying finalists; (h) have finalists present their demo of their packages; (i) identifying the winner; (j) compare the benefits (tangible and intangible) and costs; (k) negotiations; (l) run a pilot before real implementation and (m) make the final decision.

2.3.3.2 Implementation

The implementation phase refers to the stage in which ERP packages are customized or adapted to an organization's needs generally with the help of a consultant or a third party organization. In general, implementation focuses on adapting ERP system to the specific needs of the organization. However, sometimes just the opposite, adapting business processes to ERP functionalities may be the case (Esteves & Pastor, 1999).

Implementation has been examined under several phases with several tasks and subtasks within each phase. For example, Parr and Shanks (2000) explain ERP implementation in three phases: planning, project, and enhancement. Planning phase deals with "selection of an ERP, assembly of a steering committee, determination of high-level project scope and broad implementation approach, selection of a project team manager and resource determination" (p.291). This phase is similar to Ross and Vitale's (2000) design phase. Project phase includes installation. This phase is composed of five subtasks such as set-up, re-engineering, design, configuration and testing and installation (Parr and Shanks 2000). Setting the project teams and establishing the integration of these teams are the main tasks in set-up subtask. Main tasks of re-engineering subtask are BPR, installation, matching the business processes with ERP functions. Design stage is the one where detailed design is developed. The fourth subtask, configuration and testing deals with configuration of system, interface, and testing with real data. The final subtask deals with technological aspects (network, PCs, etc.) and support for the system. The enhancement phase includes the post-implementation stages such as repair, extension, transformation. This phase is similar to Ross and Vitale's (2000) "stabilization" and "continuous improvement" and Markus and Tanis' (1999) "onwards and upwards" phases (Parr & Shanks, 2000). Meanwhile, Esteves and Pastor (1999) state that implementation involves several tasks such as hardware and software installation, business process modeling, training, and data conversions from different systems. Huang et al. (2001) examine the implementation of ERP and knowledge management system with their synergetic benefits to organization. The results showed the synergy between these complementary systems allowed companies to have more flexibility and efficiency.

2.3.3.2.1 ERP Implementation Risks

The risk of implementation should be well analyzed at the beginning of implementation. Esteves & Pastor (1999) mention three types of risks to be analyzed: technical risks, business risks, and organizational risks. Technical risks are mainly related to the products whereas business risks are related to processes. Organizational risks refer to the case that the new system will not be fully used. Esteves & Pastor (1999) also state that one of the most common reasons implementations do not succeed is the lack of alignment between organizational goals and the processes.

Risk factor in generic ES projects that are relevant for ERP projects are identified in several studies. Sumner (2000) summarizes the literature regarding risk factors under eight categories. Based on this study, organizational fit that deals with the environment, resources, and changing objectives, and management structure and strategy dealing with agreements on goals, and involvement are among the most important risk factors. Lack of technical expertise and knowledge, called skill mix, lack of agreements on change requirements, technology planning, project management, and social commitment are other risk factors for generic ES projects that affect ERP projects (Sumner, 2000).

2.3.3.2.2 ERP Implementation Strategies

Organizations may choose different strategies for implementing ERPs. Some organizations may choose implementing ERP with its full functionality. The implementation may even involve a multi-national company. All the required modules may be implemented and linked to the legacy system at once (Parr & Shanks, 2000). This comprehensive approach is the most ambitious one to implement an ERP system. Some organizations may be less ambitious, called middle-road, and prefer implementing merely the core ERP modules or some selected ERP modules (Parr & Shanks, 2000). The least ambitious and least risky approach is the vanilla method. In this approach, only core ERP functionalities are implemented on one site. This is the least complex approach for implementing an ERP system (Parr & Shanks, 2000).

Literature can be grouped into three in order to examine ERP implementation strategies. These main groups are: (a) organizational strategies; (b) technical strategies; and (c) people

strategies (Adel, 2001). Organizational strategies include project management, change management, structure and resources of organizational, communication, and ES functional characteristics. Installation issues, technical expertise, and ERP complexity are some of technical strategies. Strategies regarding people include involvement, training, and attitudes of staff (Adel, 2001).

Ghosh (2002) distinguishes two main strategies for implementing ERP. The first approach requires handling each business unit as a new implementation. The cost in this approach is quite high since reuse is not considered. The second approach suggested conducting a pilot project as the first phase of implementation involving every functional unit in the organization (Ghosh, 2002).

2.3.3.2.3 Critical Success Factors of ERP Implementation

Critical success factors are one way to begin studying the technology from a strategic perspective (Laurindo, Carvalho, & Shimizu, 2010). The term Critical Success Factor (CSF) has been defined by Laurindo et al. (2010) as "a widespread method used for linking IT [ES] applications to business goals, and for planning and prioritizing information systems projects" (p.21). Rockart (1979) states "if they (CSF) are satisfactory, will ensure successful competitive performance for the organization" (p.85). Since CSF requires several analyses regarding organizational goals, strategy, industry, etc., (Laurindo et al. 2010), the process of CSF building should be scheduled for a specific time period (Laurindo et al. 2010; Rockart, 1979). This way, organization will have a better understanding of the current situation with surrounding business environment and proceed based on their strategic objectives more efficiently.

Strategic importance of ERP systems to business and the low success rate lead to a vast amount of research focused on success factors for ERP implementation. In ERP literature success of ERP was measured from several dimensions (Markus, Axline et al. 2000). Several researchers consider success in technical, economic, financial, or strategic business terms. Some view success from the organization's staff (managers and employees) perspective while others view success from customer, supplier, and stakeholder perspective (Markus, Axline et al. 2000).

According to the authors, another common perspective to assess success is related to how smooth the business operations are running in the organization.

The literature clarifies the cost of software is not cheap and may include some risks to the organization. Cliffe (1999) and Umble et al. (2003) state 65% of executives have concerns ERP implementation may harm their businesses. Because of these, it is important to identify the factors that determine ERP implementation success. Meanwhile, (Markus & Tanis, 2000, p.186–187) discuss about success as "Optimal success refers to the best outcomes the organization could achieve with enterprise systems, given its business situation, measured against a portfolio of project, early operational, and longer term business results metrics. Optimal success can be far more or less than the organization's goals for an enterprise system. Further, optimal success can be dynamic; what is possible for an organization to achieve may change over time as business conditions change."

Markus & Tanis (2000) examine success in four different phases called "ERP experience cycle." The phases are called chartering, project phase, shakedown phase, and onward and upward phases. In chartering phase, the decision to acquire or proceed with the enterprise system is examined. Project phase is the one that ERP system is configured and processes are redefined. The success factors related to this phase deal with cost, completion time, the finished system functionality relative to budget, schedule, and scope respectively. The third phase, shakedown phase, refers to the transition period that the organization goes to normal operations from initially going live. Success factors related to this phase deal with short-term impacts of external parties (i.e., customers, suppliers, etc.), the duration of achieving "normal" level of performance, and short-time changes in business performance. The final phase refers to the period in which organizations receive the benefits from the ERP system. Process improvement is one of the major activities in this stage. Success factors related to this phase deal with achievements and improvements in business in addition to expected achievements regarding ERP project, and adoptability and alignment of ERP system to business practices, and decision making (Markus & Tanis, 2000).

In literature, several factors that lead to the success of an ERP implementation have been identified. Some of the most highly mentioned factors include management support, change management, BPR, teams, training, customization, communication, project champion, clear goals, project management, support, and external expertise.

1. Management support is important throughout the whole implementation (Nah, Lau, & Kuang, 2001). While approval from the management has to be received at the beginning, management should continue actively backing the project. It is one of the main driving forces in implementation success (Somers and Nelson 2001). Details about the project, structure, roles, responsibilities, resource allocation, and policies should have been approved by the management (Nah, Lau et al. 2001; Somers and Nelson 2001).
2. Change management refers to managing the change in culture, people, organization, and structure throughout the enterprise (Nah, Lau et al. 2001). This change may include training the users and staff as well as user involvement in design and implementation (Nah, Lau et al. 2001; Holland and Light 1999).
3. BPR: Generally, existing structure, information needs, and business processes are incompatible with ERP systems even in most flexible ERPs (Umble et al. 2003; Somers & Nelson, 2001). Therefore, business processes are required to be aligned or reengineered to fit the system (Nah, Lau et al. 2001; Somers & Nelson, 2001). With aligned or reengineered processes, organizations have better performance (Somers & Nelson, 2001; Bingi et al. 1999).
4. Team: Importance of teams to implementation success has been recognized from several perspectives. Project team competence (Akkermans & Helden, 2002), selecting best people in the organizations (Nah, Faja, & Cata, 2001; Nah, Lau et al. 2001; Bingi et al. 1999), roles and responsibilities of members for implementation (Nah, Faja et al. 2001; Nah, Lau et al. 2001) knowledge, skills, and expertise of team members (Somers & Nelson, 2004; Umble et al. 2003; Somers & Nelson, 2001) are among the important criteria for selecting members of teams for implementation success.
5. Training: ERP systems cause changes in organizations and in order to get the support of employees, organizations need to train them about the long-term perspectives and goals (Somers & Nelson, 2001). In addition, training should be provided in order to improve the understanding of employees and end users about new systems and processes (Umble

et al. 2003). Without proper training, organizations cannot fully realize the benefits of EPR systems (Umble et al. 2003).

6. Customization: Minimum customization refers to using the ERP system as it is bought from the vendor (Somers & Nelson, 2001; Robinson & Dilts, 1999). Organizations want to spend less resources, time, and effort in customizing their ERP system. Organizations can minimize the scope of ERP system and reduce the customization (Shanks, 2000).
7. Communication refers to communication among different departments and business functions (Akkermans, Bogerd, Yücesan, & van Wassenhove, 2003) as well as team members and organizational members (Somers & Nelson, 2001). Since the main objective of ERP is the integration of different business functions, communication is a critical issue for ERP implementation (Akkermans et al. 2003; Davenport, 1998).
8. Project champion: A champion should have enough authority, power, and experience to perform the transformations and set goals, therefore a champion is usually chosen among the senior level executives (Akkermans et al. 2003; Nah, Faja et al. 2001; Nah, Lau et al. 2001; Falkowski, Pedigo, Smith, & Swanson, 1998). The role and responsibilities of a champion include "communicating the vision, maintaining motivation in the project team and the business, fighting political battles, and remaining influential with all stakeholders, including senior management" (Willcocks & Sykes, 2000, p.37).
9. Clear goals, business plan, and vision provide guidelines to the project (i.e., how to operate (Holland & Light, 1999), scope, time and cost (Somers & Nelson, 2001) throughout all the phases in ERP life cycle (Nah, Faja et al. 2001; Nah, Lau et al. 2001; Buckhout, Frey, & Nemec, 1999). This allows an organization to focus in business benefits (Nah, Lau et al. 2001).
10. Project management refers to a clear and detailed project plan that describes the objectives (Umble et al. 2003; Shanks, 2000). ERPs are complex systems because of their structure, hardware, software, human and political issues, etc. (Somers & Nelson, 2001) and one way to deal with complexity may be using a calculated management (Akkermans & Helden, 2002; Soliman & Youssef, 1998). According to contingency approach, project management deals with project planning and size, experiences with the technology, and project structure as the functions of the project's characteristics (Somers & Nelson, 2001, p.3). An effective project management should deal with the scope, time, and cost

(Sumner, 1999). Milestones (Holland & Light, 1999), deadlines and tasks (Nah, Lau et al. 2001) are some of the key elements that should be identified under project management.

In addition to these factors, there are several success factors mentioned in literature. For example, vanilla ERP (Parr & Shanks, 2000; Rao, 2000), empowered decision makers (Parr & Shanks, 2000), data accuracy, focused performance measures, understanding of strategic goals (Umble et al. 2003), vendor support, data conversion, architecture choice (Akkermans et al. 2003), use of consultants (Somers & Nelson, 2004; Akkermans & Helden, 2002; Somers & Nelson, 2001; Brown & Vessey, 1999), conversion strategy (Brown & Vessey, 1999), software development, testing, and troubleshooting, ES legacy systems (Nah & Delgado, 2006; Nah, Zuckweiler, & Lau, 2003; Nah, Lau et al. 2001), employee satisfaction and involvement (Barker & Frolick, 2003), package selection (Somers & Nelson, 2004; Al-Mashari et al. 2003; Akkermans & Helden, 2002; Somers & Nelson, 2001), vendor customer partnerships, interdepartmental cooperation (Somers and Nelson 2001; 2004), technical compatibility, competitive pressure (Bradford & Florin, 2003), human resource planning, strategic decision on centralized vs. decentralized implementation (Rao, 2000), ES maturity, business size, government, economy and economic growth (Huang & Palvia, 2001), discipline and standardization (Sumner, 1999), realistic expectations in regards to ROI and reduced IT/IS/ES costs (Murray & Coffin, 2001) are among the other mentioned critical success factors.

Although the ranking orders were different, Akkermans et al. (2003), Finney & Corbett, (2007), and Somers & Nelson (2001) highlight the same variables being critical for the ERP implementation success in their empirical studies. These factors include top management support, project team competence, interdepartmental communication and cooperation, clear goals and objectives, project management, interdepartmental communication, management of expectations, project champion, ongoing vendor support, careful package selection, data analysis and conversion, dedicated resources, steering committee, user training and education on new business processes, Business Process Reengineering (BPR), minimal customization, architecture choices, change management, vendor/customer partnership, vendor's tools, use of consultants, and steering committee (see Table 14).

Organizations invest huge amounts of resources in terms of time, money, and effort for implementing ERP systems. A typical ERP project may take around 2-3 years of time, based on the size of the organization and type of implementation (i.e., vanilla or in house, etc.) may cost millions of dollars. After that amount of investment, management wants to see the benefits of ERP systems. Although there are several risk factors for ERP systems such as skills mix or expertise, structure of the management, user involvement, training, software systems design, technology planning, project management as well as commitment (Sumner, 2000), the most critical factor for not failing the ERP system is alignment. Failing to align may harm the organization or even cause organizations to bankrupt.

Table 14 Selected Critical Success Factors of ERP Implementation

	Top Management Support	*Change Management*	*BPR*	*Importance of Team*	*Training*	*Customization*	*Communication*	*Project champion*	*Clear goals*	*Project Management*
Parr and Shanks (2000)	**X**	**X**		**X**				**X**	**X**	
Umble et al. (2003)	**X**	**X**		**X**	**X**					**X**
Akkermans and Helden (2002)	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Brown and Vessey (1999)	**X**	**X**		**X**		**X**				
Nah et al. (2001), Nah et al. (2003), Nah and Delgado (2006)	**X**	**X**	**X**				**X**	**X**	**X**	**X**
Sarker and Lee (2003)	**X**			**X**			**X**			
Barker and Frolick (2003)	**X**	**X**								
Somers and Nelson (2001; 2004)	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Bradford and Florin (2003)	**X**		**X**		**X**				**X**	
Rao (2000)	**X**			**X**	**X**					**X**
Huang and Palvia (2001)	**X**		**X**							
Sumner (1999)	**X**		**X**		**X**		**X**	**X**		**X**
Shanks et al. (2000)	**X**	**X**		**X**	**X**	**X**		**X**	**X**	**X**
Percentage (%)	**100**	**62**	**46**	**62**	**54**	**31**	**39**	**46**	**46**	**54**

2.3.3.2.4 Models and Frameworks for ERP Implementation

Based on the framework for ERP implementation by Al-Mudimigh et al. (2001) there are three levels within the ERP system implementation: strategic level, tactical level, and operation level. Strategic level is the one where management determines the overall goals and steps to

follow in order to achieve these goals. In the strategic level, there must be a strategy that reflects the business vision to follow and decision making is the responsibility of top management (Turban, McLean, & Wetherbe, 1999). ERP specific planning for the organization is realized under tactical level. Middle managers play an important role in this level. Process monitoring is part of this level where middle level managers ensure whether resources are used properly, or whether goals are being accomplished. The decision regarding the vendor and software selection is also one responsibility done under this level (Al-Mudimigh et al. 2001). Operational level involves installation, business process involvement, making the configurations, and going live. In many times, companies may need to use other packages from different vendors and the integration of these packages also a crucial step before realizing the benefits of an ERP system (Al-Mudimigh et al. 2001) (see Figure 19).

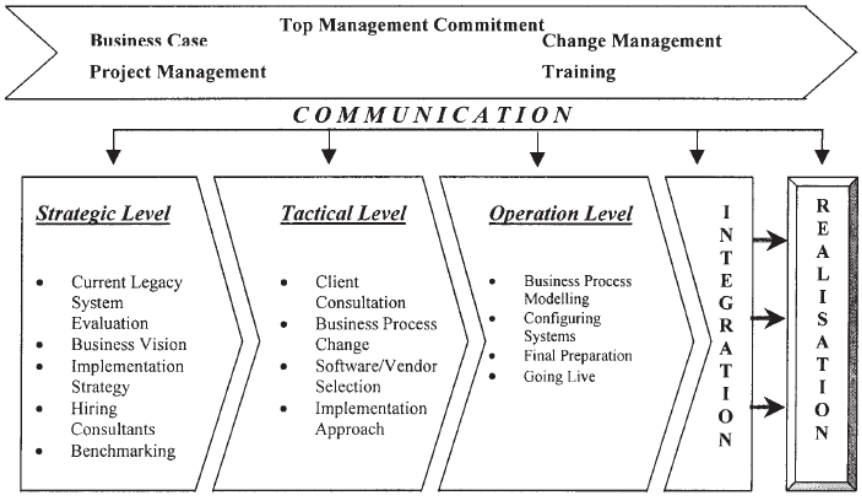

Figure 19 ERP Implementation Framework (Al-Mudimigh et al. 2001, p.218)

ERP implementation includes business process change and alignment with software (Holland & Light, 1999). Based on this fact, the authors propose a framework about critical success factors that will ensure a successful ERP implementation. The proposed framework is composed of two factors: strategic and tactical. Strategic factors include legacy systems (business processes, organization structure, culture, and information technology), business vision, ERP strategy (i.e., fast-track vs. adopting a skeleton, complete functionality vs. single module implementation, custom development, etc.), support from top management, and plans; while tactical factors include client consultation, personnel, configuring software,

communication, trouble shooting, and feedback. Finney & Corbett (2007) provide a similar categorization of critical success factors. The additional factors Finney & Corbett (2007) propose include project and management, managing cultural change, implementation strategy and timeframe, and vanilla ERP as strategic factors and balanced team, team motivation, ES infrastructure, software configuration, testing system, training, data conversion, and post-implementation evaluation as tactical factors. Esteves, Casanovas, & Pastor (2003) examine the same success factors, both strategic and tactical ones. The authors also state that examining ERP implementation from organizational and technological dimensions would contribute a lot to ERP implementation literature (see Figure 20) for the framework developed by Holland and Light (1999).

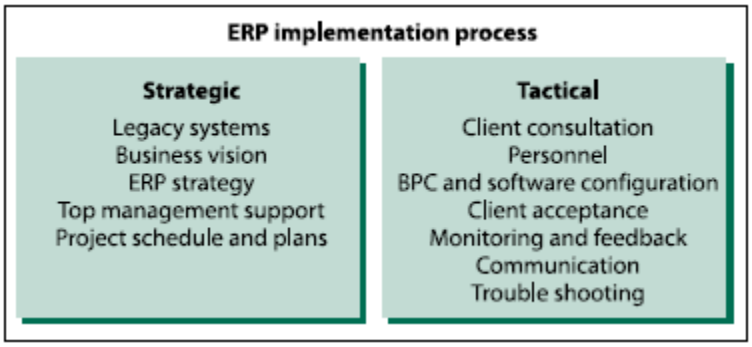

Figure 20 ERP Implementation Framework (Holland & Light, 1999, p.31)

Huang and Palvia (2001) propose a framework to examine ERP implementation and the factors affecting ERP implementation in developed and developing countries. According to Huang and Palvia (2001), ERP implementation is affected by two categories: national/environmental and organizational/internal. These categories are composed of five elements. The variables included in national/environmental category are infrastructure (basic and IS), economy and economic growth of the nation, manufacturing strengths, regional environment, and government regulations. On the other hand, organizational/internal variables include ES maturity (in order to have more efficient strategic decision in acquiring and deploying ES), computer culture (i.e., attitude and dependence on computers), business size, management commitment, and BPR experience (see Figure 21). Their study indicates there are differences in developing and developed countries in ERP implementation. These difference stems from the economic, cultural, and basic infrastructure issues that are different in both types of countries.

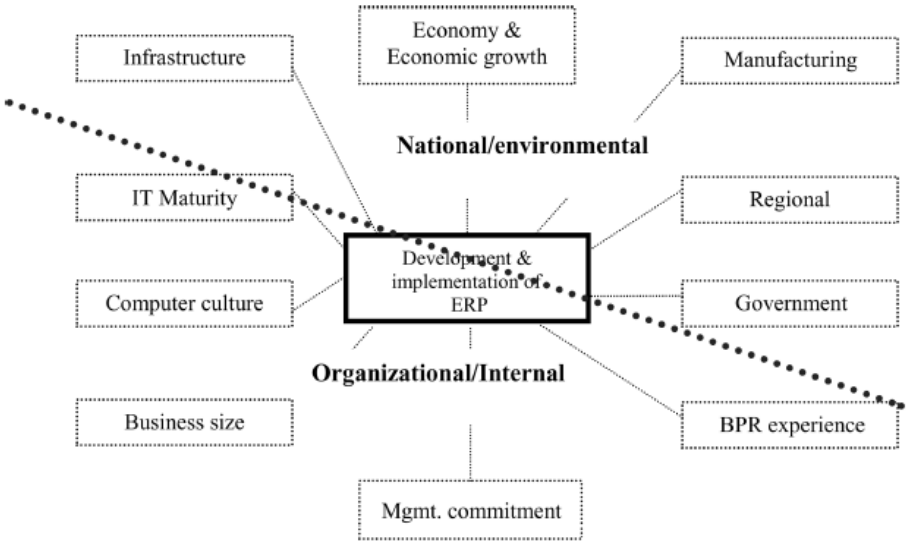

Figure 21 ERP Implementation Framework (Huang & Palvia, 2001, p.277)

Motwani, Mirchandani, Madan, & Gunasekaran (2002) examine critical success factors of ERP implementation as well as the actions needed to take in order to control the troubled ERP projects. The authors use Kettinger and Grover's (1995) model to explain the implementation. According to this model, strategic initiative is required for any business process change that will be lead by managers. Process management and change management that are components of ERP implementation management are facilitated by the organizational environment that includes cultural readiness, willingness and capacity to learn and share knowledge, and relationship balancing (see Figure 22). Unlike the hierarchical revolutionary project scopes, the authors propose an evolutionary and bureaucratic implementation process that will give priority to cultural readiness, change management, network relationship, and sharing in order to have improved business processes and quality of work life.

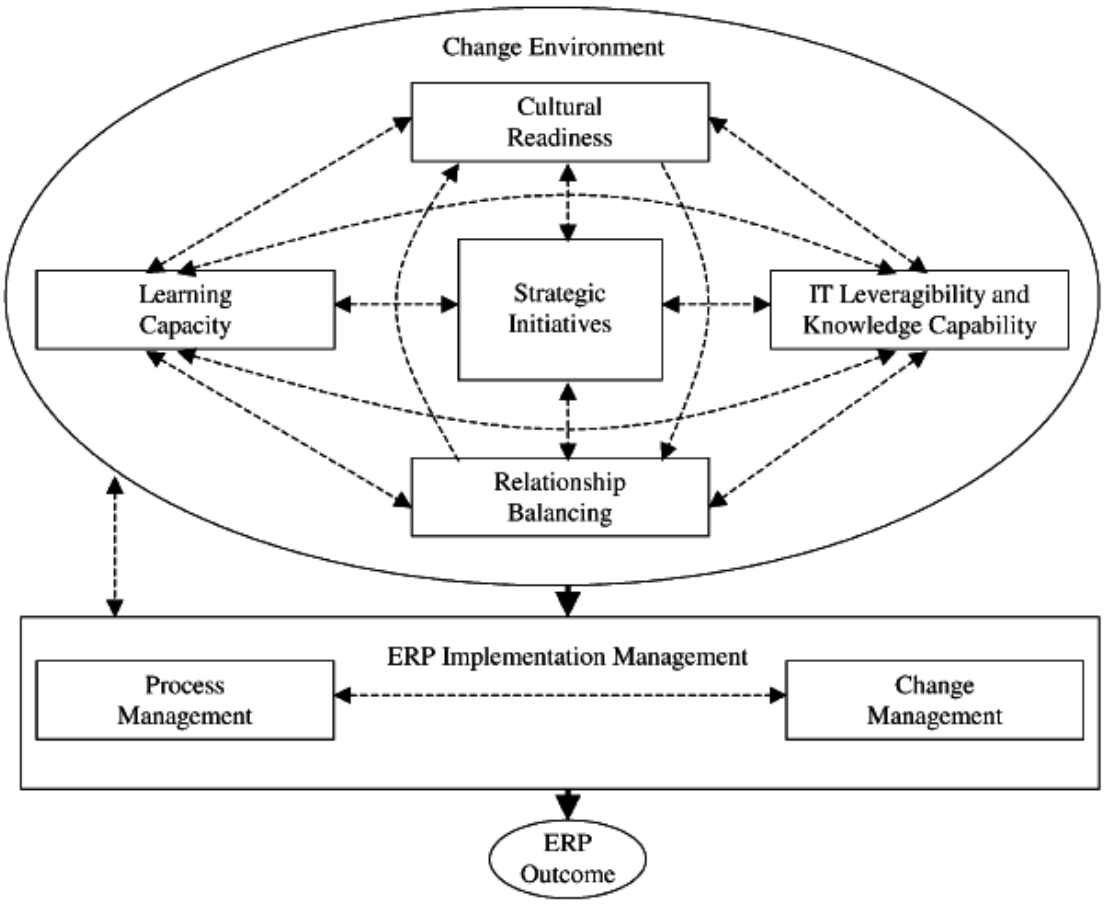

Figure 22 ERP Implementation Management Framework (Motwani et al. 2002, p.85)

Hong & Kim (2001) examine critical success factors of ERP implementation with an organizational fit perspective. The authors examine only a limited amount of CSFs for ERP implementation. Their model propose that: (a) organizational fit of ERP (i.e., data, process, and user fit) positively affects the ERP implementation success (match between the goals and actual cost, time, performance, and benefits); and (b) contingency variables such as ERP adaptation level, process adaptation level, and organizational resistance has interaction effect between organizational fit of ERP and ERP implementation success (see Figure 23). Their findings state organizational fit is a critical factor for success of ERP implementation and also ERP and process adaptations has interaction effect between organizational fit of ERP and ERP implementation success.

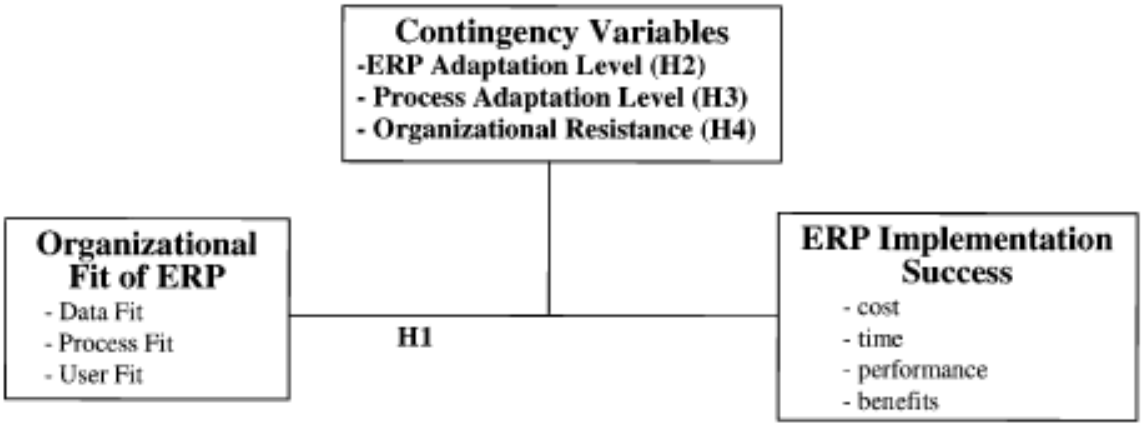

Figure 23 ERP Implementation Framework (Hong & Kim, 2001, p.28)

Several other studies propose or test models related to ERP. For example Amaoka & Salam (2004) extend Technology Acceptance Model (TAM) and examine ERP implementation based on this model. The study examines the impacts of shared belief, training, and communication on perceived usefulness and ease of technology implementation. Scott (2004) examines how the climate for ERP implementation and ERP-values fit affect ERP implementation effectiveness with their model. Sedera, Gable & Chan, 2003) develop and test a model for their empirical study where they assess the impact of knowledge management as a success factor for ERP systems. The authors determine information and system quality, satisfaction, and individual and organizational impact as criteria for the success. Meanwhile, CSF models also have been used for project management problems (Slevin & Pinto, 1987), and reengineering (Bashein, Markus, & Riley, 1994) as well.

2.3.3.3 Post-Implementation

Post-implementation is the phase which begins right after installation and goes until retirement through a set of evolutions. There is limited amount of work regarding post-implementation in the literature (Bernadas, 2007; Yu, 2005). Current studies mainly focus on implementation, and evolution of ERP systems. Although the final stage of post-implementation phase is retirement, there is either none or very limited research on this stage.

2.3.3.3.1 Maintenance of ERP

A credible definition of maintenance is "post-implementation activities related to the packaged application software undertaken by the client-organization from the time the system goes live (i.e. successfully implemented and transported to the production environment) until it is retired from an organization's production system" (Ng et al. 2002, p.88). Maintenance phase refers to the optimum use in a way that benefits are maximized while deficiencies are minimized. Maintenance phase comes after the installation of any specific software or a system. Maintenance is required for all installed systems in order to address the needs regarding correcting malfunctions and providing optimizations as well as system updates (Esteves & Bohorquez, 2007). Functionality, and sufficiency of the systems to business processes are among the key issues need be taken care during maintenance phase (Esteves & Bohorquez, 2007).

There are three different strategies for ERP maintenance: pseudo in-house maintenance, outsourcing to a vendor, and outsourcing to a third party (Bernadas, 2007) Pseudo in-house maintenance is the case where the ERP user does not have the total control over the system maintenance. This strategy is known to be the most common one among the users (Bernadas, 2007). Companies need highly skilled employees in order to accomplish a successful maintenance. Outsourcing to a vendor can be thought of as renting the system from a vendor. In this case, the vendor would be dealing with all development and maintenance of the system. It is known as quasi-complete outsourcing (Bernadas, 2007). It requires fewer resources for maintenance but the dependency to vendor is high. The last proposed strategy by the researcher is outsourcing the maintenance of the system to a third party rather than the vendor. In this stage, while relationship with the vendor is important, relationship with the third party is crucial.

Several facilitators may be helpful in maintenance of ERP. In this end, Bernadas (2007) identifies some facilitators of maintenance. These facilitators include: (a) cross-departmental communication and cooperation; (b) top management and end user supports; (c) use of maintenance tools and standards, technology experiences of organization and the ES department, and training. Other factors that affect maintenance success include size of an organization, skilled personnel, and the budget available for the system are factors that are determinant for maintenance strategy (Gable et al. 2001; Huang & Palvia, 2001). Perception of the management

and stakeholders is considered to be another key determinant for the maintenance of ERP systems (Kim & Westin, 1988).

2.3.3.3.2 Studies Pertaining to Maintenance of ERP

Kung & Hsu (1998) propose a life cycle for software maintenance that can be applied to ERP systems as well. This life cycle has four stages such as introduction, growth, maturity, and decline stages. Introduction stage is the period just after implementation. In this stage, usage is relatively low. In growth stage, users become more familiar with the functionality of the system with the increased usage. If the usage is voluntary, the amount of usage would be based on the satisfaction during the introduction stage. In the maturity stage, enhancement in projects based on functionality can be observed. In decline stage, the limits of system are faced. Management needs to decide whether continuing with the current system, or upgrading it, or abandoning it (Nah, Faja et al. 2001; Kung & Hsu, 1998).

Nah, Faja et al. (2001) and Ng et al. (2002) identify the maintenance activities through multiple case studies. The authors use the very-well known categorization of maintenance proposed by Lientz & Swanson (1978) and Swanson (1976). The proposed categories of maintenance include corrective maintenance that deals with correcting design, coding, implementation errors, processing and performance failures, adaptive maintenance that deals with meeting or adapting the new requirements in terms of processing, data, and user, and perfective maintenance that deals with enhancing the current processes efficiency, performance, and requirements, rewriting documentation, and improving maintainability.

Burch & Grupe (1993) introduce preventive maintenance that deals with preventing potential problems by conducting regular inspections or monitoring (i.e., workflow). The main idea of this study is that even a small recognized problem may turn into a big one if no precautious action has taken place. Abran & Nguyenkim (1991) examine maintenance of ERP in terms of user support and the roles of training users and building an effective help desk in maintenance stage. Hirt and Swanson (Hirt & Swanson, 1999a; Hirt & Swanson, 1999b) discuss the importance of external parties such as vendors, and consultants in the maintenance.

Several studies in maintenance literature include measuring the satisfaction from usage of ERP systems (Sedera & Tan, 2005; Hess & Hightower, 2002; Barbara McNurlin, 2001), the change and importance of change after implementing ERP system (Lee & Lee, 2004), the effects of post-implementation concepts such as documentation, usability, presentation on users (Scott, 2005), and structuring ERP outsourcing contracts in a way that both sides gain (Bryson & Sullivan, 2002). Other studies focus on benefits, limitations, effects of ERP implementation in post-ERP era, return on investment on ERP, effect of size of the organization, comparisons between companies that have adopted ERP and that have not, outsourcing and its effects, and life cycle proposals for ERP maintenance (Esteves & Bohorquez, 2007).

2.3.3.3.3 Evolution of ERP

The second stage of post-implementation is evolution. This stage includes the studies regarding extending the capabilities of ERP thorough integration of capabilities to ERP systems (Esteves & Bohorquez, 2007). Esteves & Bohorquez (2007) groups the studies into two as upwards evolution and outwards evolution. Upwards evolution refers to integration with applications such as advanced planning and scheduling, data warehousing, and business intelligence systems in order to improve the decision making (Esteves & Bohorquez, 2007). Outwards evolution refers to integration with applications such as customer relationship management, supply chain management, inter-organizational workflow, and electronic commerce (Esteves & Bohorquez, 2007).

In general, the studies in evolution phase have focused on technology, including development and new functionalities, extensions, and integration of customer relationship management, supply chain, data warehouse, web technologies, and knowledge management modules to current ERP systems.

Literature also includes several studies regarding evolution of ERP systems with different focuses. For example, Ash & Burn (2001) examine the antecedents of e-business change management in organizations that adopted ERP systems. In another study, Ash & Burn (2001) examine the international dimension of a similar study. Bendoly (2003) examines knowledge discovery and data mining extensions also known as upwards evolution of ERP systems.

Holsapple & Sena (2003) examine the relationship between ERP and decision support based on fifty-three companies that adopted ERP systems. Also the objectives of ERP planning and its effects on decision making are examined in the same study. Wagner & Bergin (2001) mention the limitations of ERP systems and how these limitations regarding strategy management can be improved. Ndede-Amadi (2004) examines how strategic alignments help to redesign business processes in enterprise-wide systems. The authors also address the benefits of collaboration with supply chain. Shafiei & Sundaram (2004) propose a framework to examine ways to integrate ERP and decision support systems at enterprise and cross-enterprise level.

2.3.3.3.4 Retirement of ERP

The final stage of post-implementation is retirement. The retirement stage is the one in which management decides to substitute the current ERP system. Possible reasons for this replacement may include strategic changes in organization, issues with vendor or third party implementer, or the unsatisfactory experience with current system or its phases (Esteves & Bohorquez, 2007). We could not find any study regarding the retirement phase. The main reason for the lack of research regarding retirement phase may be the fact that ERP implementation takes a long time. However, it is highly possible there will be many studies regarding this phase in the near future.

2.4 Alignment of ERP Systems

Although literature has an extensive amount of studies regarding ERP, there is very limited research regarding alignment of ERP systems. One exception of this statement is the studies regarding ERP alignment with the focus on process alignment. Therefore, there is a need for research about ERP alignment.

Because of the nature of alignment and the broadness of ERP concepts, these limited studies focus on only several aspects. For example, Bendoly & Jacobs (2004) examine ERP alignment with process requirements of the organization. The authors state that alignment of ERP solutions with operational needs have a perceived impact on performance. Their study is built on the framework developed by Jacobs & Whybark (2000). The authors suggest the alignment/fit between ERP solution strategies lead to better performance. Flexibility and

decentralization are the selected strategies used in the framework for alignment. Flexibility can be used in operational perspective in ES to state the "adaptability of the system to a range of changing internal and external conditions" (Jacobs & Whybark, 2000). Al-Mashari (2001) considers flexibility regarding ERP from two perspectives: industrial and organizational demands. Industrial demand refers to tailoring ERP based on the organization's needs. On the other hand, organizational demand refers to adaptability of the system. Decentralization refers to the business units' ability of making decisions independently. As the level of flexibility increases, the number of alternative transactions and processes within the ERP solution increases. When the decentralization is low, the number of databases or accounting systems is lowered as well as to a single one (Bendoly & Jacobs, 2004; Jacobs & Whybark, 2000). The authors state the lack of alignment of ERP solutions strategies based on flexibility and decentralization lead to ineffective results and therefore causes the decline of performance.

Kang et al. (2008) examine how aligning ERP affects business performance in Korean business environment. In order for an organization to improve business performance, there should be an adjustment between the usage level of integration modes, such as people, standardization, and centralization, of ERP and the purpose of ERP systems (Grabowski & Lee, 1993; Kang et al. 2008). This means ERP should allow organizations to have reduced people-based integration level while providing enhanced coordination since the nature of ERP promises these benefits (Kang et al. 2008). Their results indicate integration modes are important determinants of the level of alignment where better alignment leads to better performance. One of the limitations of this study is the limited focus of performance measurement: the operational efficiency. In addition, the authors did not focus on measuring alignment, but accepted the alignment between ERP and organizational integration modes (which is defined as "an organization simultaneously coordinates and controls the activities of different departments within the same organization, using primarily the modes of people, standardization, and centralization" (p.25)).

Welch & Kordysh (2007) explain alignment of ERP with business including the agreement of executives is a critical factor among seven key factors leading to ERP success and a better performance. The signs of lack of alignment would be lack of coordination between ERP

plan and changes in business strategy, lack of commitment from the management, and lack of directions to adapt to the organization's change process. The other factors leading to ERP success include having the right governance model, stressing the business process transformation, continuous ERP support, focusing on organizational needs, keeping the business mission as high priority, and managing ES infrastructure (Welch & Kordysh, 2007).

Although research, regarding alignment of a specific technology has not been studied extensively yet, among those limited amount of studies different scholars focus on different perspectives of alignment. For example, Yurong & Houcun (2000) examine alignment of ERP with business processes. Yurong & Houcun (2000) mention the impacts of new technologies such as data warehousing and Internet on ERP systems, and how business processes can be affected from these technologies. According to the authors, alignment also has some prerequisites that involve the processes of implementation, outsourcing, training and hiring new staff. In each stage, alignment should be considered as a goal in mind for a better performance. Willcocks & Sykes (2000) also state that aligning the business processes with business footprint is among the crucial steps for ERP systems.

Gattiker & Goodhue (2002) examine how organizations react when they have packaged systems. The authors state organizations attempt to adapt their business unit to software, more specifically ERP software. In this case, organizations align their business processes based on the software. When the existing process of business unit and capability of ERP do not match or the ERP-imbedded process is deemed superior to business process, organizations may change their processes so that they fit to ERP (Gattiker & Goodhue, 2002).

ERPs have effects on organizational strategy (Saccol, Pedron, Cazella, Macadar, & Neto, 2003). Even during adoption of alignment, organizations may need to align their organizational strategy. During this period, relationships between buyers and sellers may be affected. Organizations may also need to adjust their strategies in internal, competitive, and business portfolio levels (Saccol et al. 2003). The internal level is where the efficiency and effectiveness of organizational structure is determined. While issues related to competitiveness are determined

in the competitive level, the strategic choices are determined in the business portfolio level (Saccol et al. 2003; Bakos & Treacy, 1986).

Davis (2005) examines how customization of ERP affects the strategic alignment. The author divides the customization into two areas: strategic customization and consistency customization. Strategic customizations support business strategy and help to achieve strategic alignment. This study contributes to the understanding of critical success factor regarding customization of ERP systems and its impacts on strategic alignment. However, this study does not go beyond theorizing the relationship.

Hunton, Lippincott, & Reck (2003) examine the relationship between ERP adoption and performance. Their results indicate that size and financial health of the firm are significantly correlated with the performance for the companies that adapted ERP systems. Financial health is measured by return on assets (ROA), return on investment (ROI), return on sales (ROS), and asset turnover (ATO) and these measures are found to be better for ERP adaptors than non-adaptors. Kang et al. (2008) argue that ERP systems must be strategically aligned with business to provide superior performance. Last but not the least, in a recent study, Loukis et al. (2010) state strategic alignment between ERP and business strategies allow "the mission, goals, competitive strategy, future directions and action plan of the enterprise, and also the analysis of its external environment (e.g. competition, opportunities, threats) and the analysis of its internal environment (e.g. resources, capabilities, strengths, weaknesses), which are basic elements of its business/strategy plan, to be taken into account for the formulation of its enterprise systems plan" (p. 43). This alignment aims to provide the highest strategic potential of the ERP (Loukis et al. 2010). The focus of this research is regarding only the relationship between Information and Communication Technologies (ICT) capital, non-ICT capital and strategic alignment on labor productivity. In addition, Chou & Chang (2008) identify how to achieve more benefits from ERP. The authors state that “ERP benefits are affected not only by the original features of a firm (such as interdependence and differentiation of one plant) [8], but also by managerial interventions (i.e. organizational mechanisms (OM) or alignment). To improve ERP benefit, we proposed performing two complementary tasks – customization and OM. The former emphasizes performing the alignment of ERP software itself, whereas the latter focuses particularly on the

organizational acceptance of alignment" (p.154). In addition, in a recent study, Velcu (2010) states "ERP systems may make an increased contribution to business performance when implementing companies strive for alignment between their strategic needs and the ERP system" (p.158).

Although the topics of ERP and alignment are broad topics individually, only a limited amount of work has been done about alignment of specific enterprise systems (i.e., ERP, SCM, CRM, etc.). However, as mentioned above, researchers have pointed out the need for the research on these areas. The studies mentioned in this section are some of the few results in this area and in spite of the fact both previous research and this research are going to the same direction, because of the methodology and constructs, this study is different from other studies in this area.

2.4.1 Misalignment

In literature, the amount of studies regarding misalignment of ERP is even less than the works regarding ERP alignment. Hong & Kim (2002) and Swan, Newell, & Robertson (1999) state one of the reasons for the misfit between ERP and organizational goals is the conflict between the organization and the ERP vendor. Soh et al. (2000) and Wei, Wang, & Ju (2005) add lack of match between ERP capabilities and country, sector, or firm specific issues or requirements are the main reasons of misalignment of ERP in terms of data, functions, and output.

Organizations can choose business process change, tailoring the ERP systems or both in order to handle the misalignment issue (Wei et al. 2005; Gattiker & Goodhue, 2002; Brehm, Heinzl, & Markus, 2001; Soh et al. 2000). Change in business process may take place either incremental or radical (Wei et al. 2005; Luo & Strong, 2004). Incremental changes are related to workarounds (manual and finding alternative ways for any ERP function) and accepting the limitations of ERP systems (Soh et al. 2000). On the other hand, adopting new functionalities of ERP systems is called radical changes. Brehm et al. (2001) examine the alternative ways of tailoring an ERP system. The types of tailoring an ERP system include configuration, bolt-ons,

screen masks, extended reporting, workflow and ERP programming, user exits, interface development, and code modification.

2.5 Flexibility and Strategic Flexibility

As discussed previously, the majority of current research reveals alignment has a positive impact on performance. The complex nature of these concepts requires more detailed examination about the subject matter. Considering the fact that ES is a system that is related to information technology, in other words ERP is a strategic ES component, flexibility (either strategic or structural) of this technology; use of technology in a flexible manner, and its structure (ES structure) would have an impact on alignment.

Evans (1991) states although flexibility has been studied under several disciplines, the majority of these researches belong to the management discipline. Because of the variety of the disciplines that examine flexibility, flexibility has had different meanings under different disciplines. However, those studies have usually addressed a similar problem: "… that of adjusting available means to better achieve current and anticipated future ends" (Evans, 1991, p. 73). In the literature, flexibility has been examined from several perspectives such as product and product development flexibility, procurement flexibility, usage flexibility, operations systems flexibility, market flexibility, organizational flexibility, ERP flexibility, manufacturing flexibility, etc. (Fantazy, Kumar, & Kumar, 2009). In this research, we will examine flexibility from ES and strategy perspectives.

Although this study's focus regarding flexibility is through ERP and strategy perspective, we will briefly mention the more common perspective of flexibility in ES literature: ES structure. Duncan (1995) defines ES structure as the combination of technology components and management factors. Regarding technology component, the author defines ES structure as "a set of shared, tangible, ES resources that provide a foundation to enable present and future business applications" (p.39) while she includes ES plans, alignment, and skills as part of management factors. Byrd and Turner (2000) use three qualities as connectivity, compatibility, and modularity to describe ES structure. The authors define connectivity as "the ability of a technology component to attach to any of the other components inside and outside the organizational

environment"; compatibility as "the ability to share any type of information across any technology component"; and finally modularity as "the ability to add, modify, and remove any software, hardware, or data components of the infrastructure with ease and with no major overall effect" (p.171). Considering the nature of business world in knowledge-era in which unplanned events may occur often, keeping the flexibility of ES structure is critical for organizations (Duncan, 1995).

Our perception of flexibility is a combination of Langdon (2006) and Evans (1991) definitions of flexibility where the authors named it as ES flexibility and strategic flexibility, respectively. Evans (1991) perceives strategic flexibility as "the contemporary term for a classical principle of strategy" (p. 69). Strategic flexibility allows an organization to modify the course of action based on the encountered situations, whether they are expected or unexpected (i.e., "technical innovations, market upheavals, ecological shocks and political revolutions" (p. 69)). The importance of the strategic flexibility is undeniable under today's business world. Considering the importance of high technology in today's business world, strategic flexibility would be more critical because of the speed of the change in business processes, production, manufacturing, logistics, etc. (Evans, 1991).

Evans (1991) states "Strategic flexibility provides an enterprise with the capability to modify strategies ... practical adaptation" (p.77). The author examines strategic flexibility through four maneuvers: Pre-emptive maneuver, protective maneuver, corrective maneuver, and exploitive maneuver. The motivation behind the pre-emptive maneuvers is precipitating transformation. Organizations that want to change the rules of the game with a surprise effect may choose this way. The rules and domain can be changed dramatically by a radical innovation. Protective maneuvers allow organizations to become cautious. Organizations can be cautious when they are facing high risk situations, such as entering a new business. Examples of this action might be arranging secondary sources in a supply chain in case a problem with a supplier or potential growth chance. Corrective maneuvers allow organizations to regenerate or recover from an irrepressible trauma. Exploitive maneuvers refer to organizations finding them rapidly expanding. This usually happens to high technology companies where suddenly there is a high demand for their product and they become the "de facto" standard (Evans, 1991).

On the other hand, Langdon (2006) defines ES flexibility as "the ready capability of an information system [enterprise systems] to be adapted to new, different, or changing business requirements. Examples of such changes are rapid sales growth, new product offerings, and new business relationships." (p. 6). By combining these two researches, we can understand the current ERP flexibility concept more in depth.

Based on these definitions as well as the literature, we define ERP flexibility as "the capability of an organization to adapt or react to the expected or unexpected conditions of business requirements through effective and supportive use of enterprise systems" and because of the strategic perspective on flexibility, we call it strategic ERP flexibility. Strategic ERP flexibility allows organizations to speed up operation (Tian, Wang, Chen, & Johansson, 2009), generate innovative solutions, introduce new products or services when realizing a chance (Carignani & Seifert, 2000), closely observing competitors, identify and evaluate new business opportunities, accommodate efficient changes based on the business requirements, give learning opportunity (Tian et al. 2009; Bowman & Hurry, 1993), etc. A flexible Enterprise Wide Information Systems or ERP can allow organizations to give better and quicker response (Tian et al. 2009) to customers and suppliers changing demands and needs. Since the structure of ES plays a key role in performance (Byrd & Turner, 2000; Broadbent, Weill, & Neo, 1999; McKenney, 1995), flexible ERP can enhance the competitive performance of firms. Byrd and Turner (2000) state in order for ES to provide competitive advantage, ES must be strategic, and have impact on the "goals, operations, products, or environmental relationships of organization" (p.43).

Literature has several studies that provide conflicting results about flexibility. For example, Byrd and Turner (2000) report a positive relationship between ES structure and competitive advantage that generally leads to enhanced performance. On the other hand, Chung et al. (2005) do not find any direct impact of ES structure on the performance and suggests that ES structure may have impact on "intermediate performance variables and not overall business performance variables like ROI or market share (Barua, Kriebel, & Mukhopadhyay, 1995)" (p.39). In terms of functionality of technology, a flexible ES provides more opportunities for

sharing, and reuse of resources, innovation (Duncan, 1995) as well as reengineering of business processes (Broadbent, Weill, & Neo, 1999). These opportunities allow organizations to reduce their costs, increase the number of possible strategic options, maintain or enhance the competitive advantage, and at the end, create a positive impact on their performance. Therefore, in this study we will measure both direct and indirect effects (through alignment) of ERP flexibility, which is a subset of ES, on performance.

Henderson and Venkatraman (1993) argue that alignment and flexibility are related and mainly state alignment is critical to the ES structure. On the other hand, Duncan (1995) states although alignment will have positive impacts on the business and strategy, its impact on flexibility would be limited. In addition, Chung et al. (2003) state the positive relationship between flexibility and alignment, they hypothesize that flexibility has the impact on alignment, more specifically the strategic alignment of business and ES.

In this study, we will be examining alignment at the organizational level rather than the process level. We will measure alignment in terms of a synergy between business strategies and ERP strategies as well as profile deviation based on Venkatraman's (1989) fit measures. In addition, because of the fact alignment can be affected by several factors (Peppard & Breu, 2003; Chan, 2002; Luftman, Papp, & Brier, 1999), we will examine the flexibility of ERP and the relationship between alignment, flexibility, and performance. In this study, for the rest of the thesis, flexibility and strategic ERP flexibility has been used interchangeably.

2.6 Business Performance

Performance is a generic term and has been used in many disciplines and fields. Because of this variety, there are different perspectives to measure performance. Neely, Gregory, & Platts (1995) define performance measurement as "the process of quantifying the efficiency and effectiveness of action" where "effectiveness refers to the extent to which customer requirements are met, while efficiency is a measure of how economically the firm's resources are utilized when providing a given level of customer satisfaction" (p.80). In the alignment and business literature, business performance has been studied as one of the most widely used constructs that is positively associated with alignment (Joshi, Kathuria, & Porth, 2003; Byrd et al. 2006;

Boulianne, 2007; Velcu, 2010; Schneiderjans & Cao, 2009; Cao & Hoffman, 2011; Cao, Baker, & Hoffman 2011).

In the management literature, performance has been examined from several perspectives (Bergeron, Raymond, & Rivard, 2004; Marr & Schiuma, 2003; Neely, Richards, Mills, Platts, & Bourne, 1997). In this study, our focus is about business performance. Business performance, too, has been examined by several disciplines such as accounting (Ittner & Larcker, 1998; Bromwich & Bhimani, 1989), finance (Jacobson, 1990; Mehran, 1994), economics, organizational behavior (Meyer & Gupta, 1994), strategy (Chakravarthy, 1986), human resource management (Wall & Wood, 2005), operations management (Fitzgerald, Johnston, Brignall, Silvestro, & Voss, 1991), marketing (Fornell, 1992; Phillips, Chang, & Buzzell, 1983), psychology (Edward, 1967), and sociology. In addition, several authors have presented different approaches for measuring performance (Chenhall, 2005; Neely et al. 1995). For example Performance Pyramids and Hierarchies (Lynch & Cross, 1995), and Balanced Scorecards (Kaplan & Norton, 1992) are among the highly used measurement techniques for performance.

Dossi and Patelli (2010) group the performance indicators under four categories: financial perspective, customer perspective, internal process perspective, and people perspective. The indicators of financial performance are sales revenue, operating income, contribution margin, gross margin, net income, cash flow, net working capital, days sales outstanding, return on investment, return on equity, residual income, and economic-value added while other perspectives include sales volume trend, market share, trade partner and customer satisfactions, market coverage indicators (customer), employee turnover, people training expenses, people productivity rate, time to market, innovation rate (people), process quality and productivity rate, product/service quality, service indicators, flexibility rate, and internal customer satisfaction rate (internal process) (p.511). While Kalehmainen (2010), also categorizes growth, profitability, and productivity as measures of financial performance, the author categorizes market share and customer satisfaction as static measures of financial performance since they are considered as "drivers of economic value added (EVA) growth" (p.532).

Based on the discipline or field (not even mentioning the researchers' experiences with the topic and choice) researchers examine or measure the perspective with different dimensions (therefore with different questions and methodology (Neely, 1999)). For example quality, reliability and speed of delivery, and cost might be very important for measuring manufacturing performance (Neely et al. 1995; Leong, Snyder, & Ward, 1990). In their meta analysis, Capon, Farley, & Hoeing (1990) state most of the research use growth in sales and assets, market share, advertising intensity, and capital investment as the indicators of financial performance. Other less commonly used financial performance indicators listed by the authors include geographic dispersion of production, research and development, debt, imports and exports, growth based on production, shipments, demand, and value added, diversification, industry minimum efficient scale, quality of business product and services, relative price, capacity utilization, entry barriers, vertical integration, marketing expenses, economics of scale, firm social responsibility, consumer vs. industrial sales, firm variability in return, inventory, and control. Moreover, Neely et al. (1995) identifies the common dimensions on how performance has been measured. These dimensions include quality, time, cost (process view by Oge and Dickinson (1992)), customer satisfaction, and flexibility (product view by Oge and Dickinson (1992)).

In spite of all the variations about performance, Neely (1999) states there is a common goal behind all these research studies: "As one would expect, the research stance adopted by these individuals differs in terms of the questions being addressed and the methodology adopted. In essence; however, they are all seeking to address one of the two fundamental questions associated with business performance measurement, namely: what are the determinants of business performance; and how can business performance be measured?" (Neely, 1999, p. 221).

Business Performance can be examined through two approaches: based on financial data or objective data (Weill & Olson, 1989) and based on perceptions (Chan et al. 1997; Chan, 1992). In ES literature, perception based, therefore subjective measurement of performance is more common (Bergeron et al. 2004; Bergeron et al. 2001; Sapienza, Smith, & Gannon, 1988). Performance measurement based on financial data is not recommended since it is difficult to get and there are several limitations, such as being unreliable and unavailable at times. One benefit of examining business performance through perception is to be able to capture realized

performance rather than intended performance. An organization may have planned on their performance; however, these goals are not always achieved. Therefore, examining realized performance provides more reliable results while measuring performance of organizations. As suggested by researchers, we have examined business subjective performance which is based on financial facts.

In addition, a recent and well respected method for measuring performance is examining performance over different components such as profitability, productivity, and growth (i.e., market share, cash flow, net profits, sales growth rate, return on sales, return on investment, revenue growth, etc. (Chan, 1992; Sabherwal & Chan, 2001; Raymond & Croteau, 2009), asset turnover, profit margin, return on equity and sales markup (Tallon, 2007)). This method is also a complementary approach while examining flexibility (Barua et al. 1995; Chung et al. 2005). Several researchers, Chan (Sabherwal & Chan2001; Chan et al. 1997; Chan, 1992), Cragg et al. (2002), Raymond & Croteau (2009), Croteau & Raymond (2001), etc., have stated examining performance through these variables is an acceptable approach and therefore adapted this approach for their studies. Therefore, we have adopted this approach for this study and expanded it through two dimensions: relative financial performance and absolute financial performance. Both these approaches use the elements suggested by researchers such as revenue growth, financial liquidity, market and share gains, net profits, return on investment, and overall performance relative to their competitors. There is also their actual cash flow, net profits, return on sales and return on investment. Another extension of performance measurement is the addition of product and service innovation which is also suggested by Chan.

In summary, for this study, among various types of performance definitions and performance measurement, we follow the approach of Chan et al. (1997) and Chan (1992) and focus on the perception of respondents regarding performance. Therefore, we are measuring realized business performance based on perceived business performance supported with financial facts.

2.7 Types of Measurement of Alignment

There are few studies in literature that include methods about alignment in general. For example, Richardson, Taylor, & Gordon (1985) use measured alignment (congruence) through a congruency scoring matrix where they assigned low, medium, or high values for their corporate missions and manufacturing tasks. At the end, they use this value for their regression analysis where they estimate profit through measure of corporate focus, level of congruency, and cost orientation. Cleveland, Schrder, & Anderson (1989) identify nine areas – strategic profiles (adaptive manufacturing, cost-effectiveness of labor, delivery performance, logistics, production economies of scale, process technology, quality performance, throughput and lead time, and vertical integration) (p.657-658) that would identify the competence via categorization of perceived weakness and strength that would mean success or failure. Their processes include classifying the organization's business strategy, ranking the performance areas, assigning a competence index based on strengths and weaknesses of each performance area, and assessing the relative business performance with respect to competitors. Vickery, Droge, & Markland (1993) measure the production competence ("the degree to which manufacturing performance supports the strategic objectives of the firm" p. 436) through strategic importance, manufacturing responsibility, and performance from 31 components. The authors state in order to be able to assess the production competence, the necessary factors include: measurement of performance, accurately identifying the strategic profile of the organization, and a method that accurately assign the weight of manufacturing responsibility to the strategic profile. Schroeder and Pesch (1994, p. 77) measure alignment (degree of focus) through five criteria: i) Number of competitive priorities should not exceed two; ii) A match between plant's competitive priorities and business strategy should be established; iii) Internally consistent decision making in the plant; iv) Match between manufacturing lot size and product line; and v) Similar manufacturing requirements.

In this study, we adapt the measurement of alignment approach from Venkatraman's (1989) study. Venkatraman's alignment types are the most well known, empirically tested, and conceptually robust and are also the most suitable method for alignment. Venkatraman (1989) identifies six perspectives to measure fit/alignment: (a) fit as moderation; (b) fit as mediation; (c) fit as matching; (d) fit as gestalts; (e) fit as profile deviation; and (f) fit as covariation. The

mathematical formulation must be adequate with the concept in order to get consistent results and the researchers should question the validity of their choices (Venkatraman, 1989; Drazin & Van de Ven, 1985; Blalock, 1965). Verbalization of these perspectives are in Appendix B.

- Fit as Moderation (Interaction): Refers to the case where the impact of one variable to another one, a predictor variable and a criterion variable, is dependent on a third variable; moderator. In this case, both predictor and moderator and their fit have an effect on the criterion variable (Venkatraman, 1989). An example may be a model where strategy is an independent variable, managerial characteristics are moderator, and the performance is defined as the dependent variable (Shin, 2003; Zigurs & Buckland, 1998). Analysis of variance, subgroup analysis, and moderated regression analysis (MRA) can be used to measure the fit of this type (Venkatraman, 1989). The representation of MRA is as follows:

$$Y = a_0 + a_1X + a_2Z + e, \text{ and} \qquad (1)$$
$$Y = a_0 + a_1X + a_2Z + \mathrm{a}_3XZ + e,$$

  Where X refers to Strategic Orientation of Business Enterprise (STOBE), Z refers to Strategic Orientation of Enterprise Systems or ERP (STROES), XZ refers to the joint or interactive effect of both X and Z, while a_0, a_1, and a_2 are the coefficients and e is the error term. Compared to other methods, Chan (1992) finds the loss of information for "moderation" is less than the loss in "match". Fit as moderation has been suggested as an appropriate method for examining the link between typologies such as Miles and Snow typology and performance (Guest, 1997).
- Fit as Mediation: Refers to the case where variables have indirect effect to independent/antecedent variable and dependent/consequent variable. This type of fit is based on intervention of two or more variables. An example might be the direct and indirect effects of national economy on organizational performance (Shin, 2003; Zigurs & Buckland, 1998). Path analysis can be used for testing this type of fit (Venkatraman, 1989).

- Fit as Matching: Refers to the match between two variables independent of any anchor (Venkatraman, 1989). In other words, the basics of this method are regarding the difference between each related pair. An example may be alignment between current and ideal specifications of an ES (Shin, 2003). Analytical schemas such as analysis of variance (interaction effect), deviation scores (use of absolute difference), and residual analysis (regression of one variable on another) can be used for testing this type of fit. The equation of "fit as matching" is as follows:

$$Y = a_0 + a_1X + a_2Z + \mathrm{a}_3(|X - Z|) + e \quad (2)$$

Where X refers to STOBE, Z refers to STROES, and $|X - Z|$ is the difference that will be used as deviation scores, while a_0, a_1, and a_2 are the coefficients and e is the error term. Alternative match types include the followings (Chan 1992):

i) Fit as matching with signed difference;

$$Y = a_0 + a_1X + a_2Z + \mathrm{a}_3(X - Z) + e \quad (3)$$

ii) Fit as matching with squared, summed difference; and

$$Y = a_0 + a_1X + a_2Z + \mathrm{a}_3(\Sigma(X - Z)^2) + e \quad (4)$$

iii) Fit as matching with summed interaction.

$$Y = a_0 + a_1X + a_2Z + \mathrm{a}_3(\Sigma(\mathrm{X} * \mathrm{Z})) + e \quad (5)$$

Chan (1992) proves the first type of matching (matching as absolute difference) provides better results compared to the other three matching types.

- Fit as Gestalt: Refers to the case where there is internal congruence among multiple variables and fit is considered as a pattern. Descriptive and predictive validities are two critical issues about gestalt method (Venkatraman, 1989). Descriptive validity refers to the interpreting the gestalt from theoretical framework (Bergeron, Raymond, & Rivard, 2001) and predictive validity refers to requirement of the match between performance implications and the strategy types (Venkatraman, 1989; Bergeron et al. 2001). Gestalt approach seeks for "simultaneously at a large number of variables that collectively define a meaningful and coherent slice of organizational reality" (Miller, 1981, p.8). Factor analysis or cluster analysis can be used for testing this type of fit.

- Fit as Profile Deviation: Refers to “adherence to specified profile” (Venkatraman, 1989, p.439). This type of fit is based on adherence of multiple variables. Euclidean distance in an n-dimensional space with standardized scores as well as weights for each dimension can be used to calculate deviation from the ideal profile. While deviation from the ideal profile implies misfit (weakness of context and design (Shin, 2003, p.5)), the opposite means better fit.
- Fit as Covariation: Refers to internal consistency among theoretically related variables. In this perspective, the effect of the degree of covariance of all variables on criterion variable is examined. Although fit as gestalt and fit as covariation are similar, there is a slight difference between them. Based on Venkatraman (1989) definition, Shin (2003) states "Fit as gestalts can be regarded as a product of cluster analysis, in which a grouping of observations is made upon a set of attributes; covariation is the result of factor analysis, in which the grouping of attributes is also made from a set of observations. Covariation, therefore, indicates a logical linkage (alignment) among considered independent variables" (p.5). Confirmatory factor analysis can be used for testing this type of fit (Venkatraman, 1989).

Choice of the method of analysis should be based on the concept, theory, and the complexity of model (Bergeron et al. 2001). Therefore, following the literature about alignment, our data type, model complexity, as well as the appropriateness of the concept with the methodology, we decided to use fit as moderation and fit as profile deviation. Literature shows that moderation approach is superior to matching approach (Sabherwal & Chan, 2001; Chan et al. 1997). Alternatively, there are more discussions regarding profile deviation. Generally literature has several studies supporting, and in favor of, profile deviation approach (Klaas, Lauridsen, & Hakonsson, 2006; Bergeron et al. 2001; Chan et al. 1997; Bergeron & Raymond, 1995; Chan, 1992; Venkatraman & Prescott, 1990). Klaas et al. (2006) state “profile deviation perspective reflects best the theoretical proposition of performance effects” (p.145). Venkatraman (1989) states fit as profile deviation and fit as moderation complement each other.

The profile deviation approach requires a profile, called ideal profile that is a set of dimensions built based on particular conditions (Klaas et al. 2006; Venkatraman, 1989). This

ideal profile can be build based on two approaches: theoretical approach (i.e., Sabherwal & Chan, 2001; Naman and Slevin 1993) or empirical approach (i.e., (Bergeron et al. 2001; Zajac, Kratz, & Bresser, 2000; Bozarth & Berry, 1997; Venkatraman & Prescott, 1990; Drazin & Van de Ven, 1985). Although theoretical method is the stronger approach, empirical approach has been the popular approach for profile deviation method (Klaas et al. 2006; Bergeron et al. 2001; Bozarth & Berry, 1997). There are several disadvantages of empirical approach (Klaas et al. 2006; Drazin & Van de Ven, 1985) of determining the ideal profile: "the profiles of the high performing organizations in the calibration sample may well be less than ideal or optimal; if this is the case, the empirical results will accordingly underestimate the negative performance implications from misfits, i.e. deviations from the ideal profile" (Klaas et al. 2006, p.144) and difficulty in identifying the impact of ideal profile on performance. The authors report three issues where the empirical studies lack in that sense: i) the measurement of individual deviations from internal and external profile and their aggregation; ii) weights of each individual elements of a profile; and iii) the effect of the directions (i.e., "underestimating negative impact on performance", p. 144) of deviations from the profile.

The size of deviation from the ideal profile represents the misfit. Klaas et al. (2006) identify three types of misfit regarding profile deviation: i) external and internal fit; ii) critical misfits; and iii) overfit and underfit. For example, while underfit is negatively associated with effectiveness, overfit is negatively associated with efficiency (Klaas & Donaldson, 2009). Similarly, comparison of external and internal misfits, and underfit and overfit would give managers the idea what they should focus on for a better alignment.

Calculation of fit or misfit through profile deviation approach is more complex than other approaches. In profile dimension, as mentioned earlier, researcher needs an ideal profile or pattern on dimensions (Bergeron et al. 2001; Drazin & Van de Ven, 1985). The end deviation from this profile represents the misfit while subtraction of this score from 1 (considering that the range of ideal profile is between -1 and +1) gives the fit or alignment. The more the distance calculated through Euclidian distance, the lower the fit between the constructs.

Literature has few alternatives for building the ideal profile: using a calibration sample of the top 10% of firms in terms of performance (Bergeron et al. 2001; Venkatraman & Prescott, 1990); calculation through a series of empirical analysis (Bozarth & Berry, 1997), or a theoretical approach (Sabherwal & Chan, 2001). As mentioned earlier, empirical methods raise many concerns about their robustness and validity. Narasimhan and Wang (2000) examined Bozarth and Berry's (1997) approach and found methodological errors in their approach. Therefore the authors suggest using a 10% calibration instead of a set of complex empirical methods for the ones who insist on using an empirical method for building the ideal profile. Another alternative approach for empirical method is to use either equal weights or beta coefficients from regression analysis.

Another critical problem with this empirical approach is the assumption of equal weight of constructs or dimensions on performance. Since it is just an empirical method based on data, there is no theoretical or empirical reasoning to justify a different weight (Bergeron et al. 2001). Table 15 presents the fit or alignment studies in the ES literature.

Table 15 Fit Studies in Literature (extended from Bergeron et al. 2001, p.1005)

Author(s)	Matching	Moderation	Mediation	Gestalt	Covariance	Profile Dev.
Bergeron & Raymond (1995), Bergeron et al. (2001)	Y	Y				
Chan (1992)	Y	Y	Y	Y	Y	Y
Chan et al. (1997)	Y	Y				
Sabherwal & Chan (2001)						Y
Bergeron et al. (2001)	Y	Y	Y	Y	Y	Y
Bozarth & Berry (1997)						Y
Teo & King (1996)				Y		
Brown & Magill (1994)				Y		
Fiedler, Grover & Teng (1996)	Y					
Raymond, Paré & Bergeron (1995)	Y					
Bergeron et al. (2004)				Y		
Raymond & Bergeron (2008),Raymond & Croteau (2009) , Chan et al. (2006)						Y
Croteau & Bergeron (2001)			Y			
Croteau & Raymond (2004)					Y	
Tallon (2008)		Y				Y

Studies focuses are as follows:

- Bergeron & Raymond (1995) - Aligning business strategic orientation with strategic ES management to performance.
- Chan (1992) – Performance impacts of business and ES strategy.
- Chan et al. (1997) - Performance impacts of alignment of strategic orientation and ES strategic orientation.
- Bergeron et al. (2001) - Fit in strategic ES management with comparison of types of fit measurement.
- Bozarth & Berry (1997) – Fit between market requirements and manufacturing.
- Teo & King (1996) - Performance impacts of administrative, sequential, reciprocal, and full integration between business planning and ES planning.
- Brown & Magill (1994) - Alignment of ES structure and organization.
- Fiedler, Grover & Teng (1996) - ES and formal organizational structure taxonomy.
- Raymond, Paré & Bergeron (1995) - Alignment of ES management sophistication and formal structure.
- Bergeron et al. (2004) - Identifying ideal patterns of alignment and business performance through gestalt approach.
- Raymond & Bergeron (2008) - Strategic alignment between e-business capabilities and business strategy of SMEs in manufacturing industry.
- Raymond & Croteau (2009) – Strategic alignment between manufacturing strategy and advanced manufacturing technology.
- Croteau & Bergeron (2001) – Alignment between business strategy, technological deployment, and organizational performance.
- Croteau & Raymond (2004) – Alignment between ES competencies and strategic competencies.
- Tallon (2008) – Strategic alignment of ES and business strategy, at the process level.
- Chan et al. (2006) – Alignment between ES and business strategies with Miles & Snow typology.

3 Chapter: Research Model

This section explains the constructs of the proposed model in details.

3.1 Business Performance

The third construct in our model is the business performance. Performance concept has long been debated in business and enterprise systems literature. Two common performance measurements exist in the literature (Bergeron et al. 2001): i) performance measurement based on an objective approach through financial ratios (Weill & Olson, 1989); and ii) performance measurement based on a subjective approach (Chan et al. 1997; Venkataramanan, 1989). In ES research, most researchers prefer subjective measurement of performance over objective measurement since objective measurements generally have serious limitations such as focusing "only on the economic dimensions of performance, neglecting other important goals of the firm; also, the data are often unavailable or unreliable" (i.e., avoidance of corporate and personal income taxes) (Bergeron et al. 2004, p.1009; Bergeron et al. 2001; Sapienza, Smith, & Gannon, 1988, p. 131). In addition, Venkatraman and Ramanujam (1987) and Chan (1992) state there is a positive correlation between objective measurement of performance and subjective measurement of performance; therefore subjective measurement of performance can be used instead of objective measurement of performance.

There are several ways and types of metrics to measure performance. In this study, performance has been measured through subjective perception of several financial ratios. In this perspective, we have followed Chan's (1992) approach and have identified three types of performance measurements: absolute financial performance, relative financial performance, and product and service innovation. Relative financial performance (relative to competitors) is related to market growth (revenue growth, market share gains), profitability (net profits, relative return on investment (ROI)), financial liquidity, and overall performance; absolute financial performance has been measured through cash flow, net profits, return on sales and return on investment; and last but not the least, product-service innovation has been measured through the frequency of product, service, and technology development and introduction. In addition, Dossi

& Patelli (2010) state that non-financial indicators such as productivity, customer retention, and employee satisfaction can be used in measurement of relative performance.

3.2 Alignment and Flexibility

Based on the definitions of business performance, alignment, and flexibility, the relationships among them can be hypothesized. Regardless the type (i.e., strategic alignment (Sabherwal & Chan, 2001; Chan et al. 1997), structural alignment (Croteau et al. 2001), business alignment (Das et al. 1991), ES alignment, cross-dimensional alignment, and mechanisms of alignment) and direction (i.e., business strategy follow ES strategy vs. ES strategy follows business strategy, vs. they interact, etc. (Hirschheim & Sabherwal (2001)) of the alignment, studies in literature reveal alignment improves the business performance.

Despite of the general view of alignment improving business performance, we cannot argue the same about flexibility. In the literature, there are different studies with conflicting results about alignment, flexibility, and performance. For example, while Byrd & Turner (1999) stated the positive association between ES structure and performance, the Chung et al. (2005) study reports no significant relationship between ES structure and performance, but states ES structure may have an impact on "intermediate performance variables and not overall business performance variables like ROI or market share" (Barua et al. 1995, p.39; Chung et al. 2005). Researchers do not agree on the direction of relationship either. For example, Duncan (1995) states alignment has positive impacts on the business and strategy; it does not have such an impact on flexibility. Chung et al. (2003) state that flexibility has positive impact on strategic alignment.

Considering that i) alignment has related appropriate and supportive use of ERP with business strategies and objectives whilst having the objective to support the business pertaining to its plans, missions, decisions, capabilities and actions (Chan, 2002) and improve performance; and ii) ERP flexibility is related to adaptation or reaction to changes in business environment, we can expect that alignment and flexibility are positively associated with business performance. Therefore, based on the definitions and aforementioned characteristics of alignment (strategic

alignment), flexibility (strategic ERP flexibility), and performance (business performance), we can hypothesize that:

Hypothesis 1: There is a positive relationship between alignment and business performance.

Hypothesis 2: There is a positive relationship between flexibility and business performance through alignment.

Hypothesis 3: The level of strategic ERP flexibility is positively associated with alignment.

3.3 Strategy Attributes

The constructs used for this study come from the studies of Venkatraman (1989), Miles and Snow (1978), and Porter (1980), where the selection and combination of the factors have been done based on several studies such as Segev (1989), Chan (1992), Sabherwal & Chan (2001), Cragg et al. (2002), etc. The constructs have been grouped under four categories: Business Strategy Attributes, ERP Strategy Attributes, and Performance Attributes in addition to the strategic ERP flexibility construct used in this study.

Business Strategy Attributes are based on Venkatraman's (1989) study, where the author examined business strategy under seven categories (see Table 16 for the summary):

- Company aggressiveness whose objectives include dominating the market and prices even if it required reducing financial ratios, prices, profitability, etc.;
- Company analysis focuses on detailed analysis, effectiveness of ES, sophisticated outputs and planning for decision making;
- Company defensiveness focuses on quality, effective relationships with supply chain network, performance monitoring, defending market share as well as a distinguished bargaining power over buyers/suppliers;
- Company futurity focuses on the ways to be more competitive in the future through forecasts, trend and "what-if" analysis;
- Company pro-activeness focuses on developing new products and services, acquiring businesses, and seeking new opportunities;
- Company riskiness focuses on those who do not hesitate to take risk for businesses and projects (major decisions may require more conservativeness);

- Company innovativeness focuses on development of solutions through experimentation and creativity.

Table 16 Business Strategy Attributes and their Main Characteristics

Attribute	Main Characteristics
Aggressiveness	Dominating the market and prices even if it requires reducing financial ratios, prices, profitability, etc.
Analysis	Detailed analysis Effectiveness of ERP Sophisticated outputs and planning for decision making
Defensiveness	Quality Effective relationships with supply chain network Performance monitoring Defending market share Bargaining power over buyers/suppliers
Futurity	Enhance competitive in the future through forecasts, trend and "what-if" analysis
Proactiveness	Developing new products and services Acquiring businesses Seeking new opportunities
Riskiness	Take risk for businesses and projects
Innovativeness	Development of solutions through experimentation and creativity

Source: The table has been developed based on Venkatraman (1989), Sabherwal & Chan (2001).

ERP Strategic Attributes have been developed through a mirroring approach for alignment as moderation approach (Cragg et al. 2002; Sabherwal & Chan, 2001; Chan et al. 1997; Chan, 1992) and involves the same categories. The categories include ERP Support for aggressiveness, analysis, defensiveness, futurity, pro-activeness, riskiness (or risk aversion), and innovativeness. These attributes refer to the extent which current ERP provide support for the company strategy attribute for each business strategy attribute. As Chan et al. (1997) argue, this way we can focus on activity regarding the ERP rather than plans. Therefore, for each question for business strategy, there is one question corresponding to that question in the ERP section. For example, a question of defensiveness would be in ERP part as a corresponding attribute to determine whether the ERP systems support that strategy (see example below).

We develop strong relationships with our major customers

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	NA
1	2	3	4	5	0

The Enterprise Systems used in the business unit enable us to develop stronger ties with major customers

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	NA
1	2	3	4	5	0

For instance consider two organizations: one organization wants to penetrate new markets through new product development. This organization may score high for pro-activeness and analysis, aggressiveness, and riskiness while scoring low on defensiveness. On the other hand, another organization may focus on what they are doing best and keeping records of every activity. This organization may score high on defensiveness and analysis while scoring low for aggressiveness, and pro-activeness.

With the mirroring technique, each question for the business part will be modified and placed for the ES section. Therefore, a question answering about defensiveness will be matched with another question in ES section where the respondent is asked to answer to what extent they agree regarding the support that ES support for the defensiveness strategy of the organization.

3.4 Strategy Profiles

In our research, we have come up with three highly cited typologies in strategy literature. These typologies are Miles and Snow (1978), Mintzberg (1983, 1979), and Porter (1980). These typologies have been highly studied from several perspectives. Among those, Doty et al. (1993) compare two theories of Miles and Snow (1978) and Mintzberg (1983, 1979) in order to eliminate concerns about the comprehensiveness of these theories and conclude that Miles and Snow's theory is more powerful for predicting organizational effectiveness, comprehensive than Mintzberg's theory and has been used by several ES researchers (Sabherwal et al. 2001; Brown & Magill, 1998; Chan et al. 1997; Camillus & Lederer, 1985). In addition, Sabherwal et al. (2001) stated Miles and Snow's typology addresses both corporate level and business level strategies.

Miles and Snow (1978) examine strategy, structure, and process of an organization as well as their relationships in a way that identifies organizations and their integration with their own environments. Miles and Snow (1978) classify organizations into four theoretical categories: i) defenders; ii) prospectors; iii) analyzers; and iv) reactors. Defenders refer to organizations that have a narrow product-market domain. In this type of organizations, managers are usually experts in the organization and are not interested in opportunities external to their own domains. These organizations focus on cost saving, improving efficiency rather than adapting new technologies, structures, or operations, or product development. They follow a classical planning sequence of "plan-act-evaluate". Management style and decision making in this type of organization is usually centralized and more autocratic (Tavakolian, 1989; Miles & Snow, 1978).

Prospectors refer to organizations that seek market opportunities and effectiveness to some degree. These organizations usually adapt to emerging environment trends quickly and initiate change so that others need to respond. They are product and market innovation centric and not as efficient as defenders. They follow "evaluate-act-plan" sequence in their planning process. Management style and decision making in this type of organizations is decentralized, and more based on participation (Tavakolian, 1989; Miles & Snow, 1978).

Analyzers combine the strengths of Defenders and Prospectors. Under existence of stable business environments, Analyzers follow a certain structure and process. In other cases managers watch the competitors and adopt the most promising one. The main characteristic of Analyzers is to minimize risk while maximizing growth. They both use "plan-act-evaluate" and "evaluate-plan-act" sequence of planning based on whether the environment is stable or more turbulent. The management style and decision making in this type of organizations is balanced and concerned with both efficiency and effectiveness (Tavakolian, 1989; Miles & Snow, 1978).

Reactors are the organizations that do not have a stable strategy-structure relationship and are unpredictable (Doty, Glick, & Huber, 1993). Although managers recognize the need for

change, these organizations lack the ability to respond to these needs effectively. Environmental pressure is the main effect that makes Reactors adjust themselves (Miles & Snow, 1978).

The Miles and Snow typology is widely used in literature. For example, Hambrick (1983b) examines Miles and Snow's typology to find how effectiveness varies among different industries and the effects of functional tendencies on strategic type choice. Burgelman (1983) examines the relationship between the Miles and Snow typology and strategies proposed by Mintzberg. Sabherwal & Chan (2001) examine strategic alignment by using Miles and Snow typology.

Alternatively, Porter's typology includes four successful and one failure strategy as Cost Leadership, Differentiation, Cost-Focus, Differentiation-Focus, and Stuck in the Middle, respectively. Cost leadership refers to companies, whose objective is to increase their relative market share through several methods such as cost minimization in R&D, advertising, etc., controlling overhead, efficient facilities, etc. The returns from the operations are invested in new supplies that will contribute to cost leadership objective. Differentiation focuses on a unique product or service (i.e., brand, technology, etc.) and gains the loyalty of customers. Cost-focus also focuses on cost minimization, efficient facilities etc. as cost leaders do. The difference is companies following cost focus strategy perform in a narrower sense such as a region, segment or a customer group rather than the industry. Differentiation focus is also limited form of differentiation but on a unique product or service. Stuck in the middle strategy lacks a specific strategy, internal consistency, and are incompatible (Vickery et al. 1993; Segev, 1989; Snow & Hambrick, 1980).

Literature has different arguments regarding use of Miles & Snow (1978) typology Porter's (1980) typology. For example, White (1986) stated these two typologies do not exactly correspond to each other. They are not entirely two different perspectives; yet they focus on different and maybe complementary aspects of a complex phenomenon. There is also Segev (1989) who stated these two typologies complement each other and several researchers have adapted this method. For example Segev (1989) mentions the Hawes and Crittenden (1984) study where the authors used some of Porter's variables from his original work and examined the

results with Miles and Snow's typology. According to Hambrick (1983), the elements of two typologies are overlapping. For example, i) prospectors and differentiation; ii) defender and differentiation or cost leader; and iii) reactor and stuck-in-the-middle are addressing to the same aspects and can be considered as same. These two typologies have been widely used in marketing research as well. For example, Walker & Ruekert (1987) recognized the limitations of these typologies as well as their inherent strengths that can be improved upon by combining them and proposed a hybrid model that has the elements from both typologies such as Prospectors, Low Cost Defenders and Differentiated Defenders. In another study, Slater & Olson (2007) added Analyzer strategy type to Walker & Ruekert (1987) typology. Their results demonstrated the validity of this new typology.

Govindarajan (1986) uses both Miles and Snow, and Porter typologies in order to categorize business unit. Segev (1989) examines Miles and Snow typology and Porter (1980) typology in order to address the gaps between two typologies. Segev (1989) states "Porter's typology focused mainly on more concentrated industries with larger business units while Miles and Snow's typology focused on industries with more competitors" (p. 500). Literature shows these two typologies are similar in some sense, yet focus on different aspects of business (Segev, 1989), compatible with each other (Segev, 1989; White, 1986; Hambrick, 1983a) and a combination of these strategies would address more complex phenomenon regarding business and strategy. With this purpose, Segev (1989) compares the two typologies based on thirty-one different attributes and found these two typologies complete each other and proposed a framework to combine them. Segev (1989) also states that the combination of these two typologies form a new typology and states "the outcome of this synthesis is a typology incorporating the relevant components lacking in Porter's typology, i.e. the environmental components of Uncertainty, Dynamism, and Complexity; Level of Risk; and Size of Strategy making Team. At the same time, some information (albeit marginal) missing from Miles and Snow's typology on liquidity rate is provided." (Segev, 1989, p.500).

In this study, since the complementary natures and not the linearity of these typologies are important, in addition to the suggestion of researchers in literature, we have followed Segev's (1989) approach in terms of ERP and business strategies where the author combined Miles and

Snow (1978) and Porter (1980) typologies. The elements of the typologies used as business strategy profiles are as follows:

- Prospector – Seek market opportunities, first-in in new products, flexible, quick adaptation, broad and continuously developing product and service domains, less formalized and decentralized control, aggressive competition strategy, and profit making orientation.
- Differentiation (focus) - Unique product or service offering (technology, brand, customer service, quality, product performance, reliability, and technology, accessibility, features, etc.), satisfactory meeting with customer needs, has high loyalty from customers, low price sensitivity, creates high entry barriers for competitors.
- Analyzer - Focus on maintaining stability, cost-efficiency, limited product and service offer, second-in in new products, imitation of product after proven viability, seek for combination of both effectiveness and efficiency, and hybrid domain as well as same distance to centralization and decentralization (between defenders and prospectors).
- Cost focus/leadership - Cost leadership through a favorable access to raw material, high importance of efficient scale facilities, control over costs and overhead, tendency to minimize cost through reduction in R&D, advertising, etc. costs, target may be narrow. Keep attention on cost reduction and meanwhile do not ignore the quality, service, etc.
- Defender - Niche, works in stable domain, limited range of products/services or market domain (segment), focuses on quality, lower prices, etc., aims to do the best, centralized decision making and control, high bureaucracy, high cost-efficiency, market penetration, conservative in competition, follow "plan-act-evaluate" approach.

The categorization does not include all the items from the typologies because of the problems stemming from the definitions of these items. For example, as mentioned earlier, the forth type of strategy defined by Miles and Snow (1978) is Reactors. Characteristics and problems of organizations having this type of strategy include lack of a consistent product-market orientation, unclear strategy definition, unable to shape its structure to any strategy, lack of response to needs. In addition, the fifth element Porter's typology "stuck in the middle" is also removed from the analysis because of several reasons found in other studies (Cragg et al. 2002; Sabherwal & Chan, 2001; Chan et al. 1997). These firms do not have specific market share or

investments. They also lack the low-cost focus or differentiation focus unlike aforementioned firms. Table shows the summary of strategy attributes and strategy profiles with their key characteristics (see Table 17 for summary of the mapping between business strategy profiles and attributes).

Table 17 Mapping of Business Strategy Profiles and Business Strategy Attributes

Strategy	Typology	Selected Key Characteristics
Prospectors	Miles and Snow	Seek market opportunities Flexible First-in in new products Quick adaptation and decision making Lack of formalization
Differentiators / Differentiation Focus	Porter	Unique product or service offering Satisfactory meeting with customer needs High loyalty from customers
Analyzers	Miles and Snow	Focus on maintaining stability Cost-efficiency Limited product and service offer Second-in in new products Imitation of product after proven viability Seek for combination of both effectiveness and efficiency Hybrid domain Seek for integration Same distance to centralization and decentralization High level of analysis
Cost Leaders / Cost Focus	Porter	Favorable access to raw material High importance of efficient scale facilities Control over costs Minimize cost via reduction in R&D, advertising, etc. costs Narrow target
Defenders	Miles and Snow	Niche Stable domain Efficiency Limited range of products/services or market domain Focus on quality, lower prices, etc. Aims doing the best Centralized decision making and control High bureaucracy High market penetration Conservative in competition Follow "plan-act-evaluate" approach Long term planning
Stuck in the Middle	Porter	Lack specific market share or investments Lack the low-cost focus or differentiation
Reactors	Miles and Snow	Lack of a consistent product-market orientation Unclear strategy definition Unable to shape its structure to any strategy Lack of response to needs

Source: The table has been developed based on Miles & Snow (1978), Porter (1980), Segev (1989), Doty et al. (1995), Chan (2001) studies.

Table 18 represents the strategy attributes and compares the studies of Segev (1989), Doty et al. (1995), Sabherwal & Chan (2001) and this study.

Table 18a Basis for Business Strategy Profiles from Selected Articles

Attribute	Business Profile	**S1**	**S2**	**S3**	**S4**	**Justification**
Defensiveness	***Prospectors***	Low	-	Low	VeryLow	- Venkatraman (1989), and Sabherwal & Chan (2001) identify defensiveness as the key attribute of defenders, which is higher than Prospectors and Analyzers. - Segev (1989) study places differentiation and cost leader before and after analyzers in terms of defensiveness, respectively. - Consistent with Venkatraman (1989), Sabherwal & Chan (2001), and Segev (1989).
	Differentiators	-	-	-	Low	
	Analyzers	Medium	-	Medium	Medium	
	Cost Leaders	-	-	-	High	
	Defenders	High	-	High	VeryHigh	
Risk Aversion	***Prospectors***	High	-	Low	VeryLow	- Consistent with Sabherwal & Chan (2001) and Segev (1989). - Miles and Snow (1978) define prospectors as high risk takers, while defenders avoid risk. The authors place analyzers between prospectors and defenders. - Segev (1989) identifies differentiation and cost leader between prospectors and defenders.
	Differentiators	-	-	-	Medium	
	Analyzers	Low	-	High	VeryHigh	
	Cost Leaders	-	-	-	VeryHigh	
	Defenders	Low	-	High	VeryHigh	
Aggressiveness	***Prospectors***	High	High	High	VeryHigh	- Consistent with Doty et al. (1993), Shortell & Zajac (1990), and Sabherwal & Chan (2001). - The authors define prospectors as aggressive compared to analyzers and defenders, where defenders are reported as less aggressive and play safe than analyzers. - Segev (1989) places differentiation and cost leader before and after analyzers in terms of aggressiveness.
	Differentiators	-	-	-	High	
	Analyzers	Medium	Medium	Medium	Medium	
	Cost Leaders	-	-	-	Medium	
	Defenders	Low	Medium	Medium	Medium	
Proactiveness	***Prospectors***	High	-	High	VeryHigh	- Consistent with Segev (1989) and Sabherwal & Chan (2001). - Proactiveness is the key attribute of prospectors while this characteristic is less and less significant for analyzers and defenders, respectively (Venkatraman 1989; Sabherwal & Chan 2001). - Segev (1989) identifies differentiation and cost leader between prospectors and defenders in terms of proactiveness.
	Differentiators	-	-	-	High	
	Analyzers	Medium	-	Medium	Medium	
	Cost Leaders	-	-	-	Low	
	Defenders	Low	-	Low	VeryLow	

Table 18b Basis for Business Strategy Profiles from Selected Articles (Continued)

Attribute	Business Profile	**S1**	**S2**	**S3**	**S4**	**Justification**
Analysis	***Prospectors***	L_E / H_I	-	Medium	Medium	- Consistent with Miles & Snow (1978), Segev (1989) and Sabherwal & Chan (2001). - Analysis is the key characteristics of analyzers while prospectors and defenders show the analysis characteristics to some degree. - Segev (1989) identifies differentiation and cost leader between prospectors and defenders in terms of analysis.
	Differentiators	-	-	-	High	
	Analyzers	L_I / H_E	-	High	VeryHigh	
	Cost Leaders	-	-	-	High	
	Defenders	H_I / H_E	-	Medium	Medium	
Futurity	***Prospectors***	-	Medium	Medium	Medium	- Consistent with Doty et al. (1993), Sabherwal & Chan (2001). - Defenders are more stable and focus on improving current conditions for future. Although prospectors are more quick profit making oriented, they do invest for long term R&D (Sabherwal & Chan, 2001; Miles & Snow, 1978). Cost leaders have higher concentration in long term cost reduction. - Based on Segev (1989) differentiators are close to prospectors and analyzers.
	Differentiators	-	-	-	Medium	
	Analyzers	-	Medium	Medium	Medium	
	Cost Leaders	-	-	-	High	
	Defenders	-	High	High	VeryHigh	

Source: This table is an extension of Sabherwal & Chan (2001, p.27-28)'s table of "The Basis for the Ideal Business Strategy Profiles" (Adapted with Permission).

Notes 1:

- S1 refers to Segev (1989) work;
- S2 refers to Doty et al. (1993) work;
- S3 refers to Sabherwal & Chan (2001) work;
- S4 refers to this study.

Notes 2:

I refers to Internal; E refers to External for each H_X and L_X.

3.5 Calculation of Alignment

Another critical issue for the analysis is the calculation of alignment. Literature does not provide much variety of measurement for alignment. However, Venkatraman (1989) describes six types of calculation for alignment: Fit as Moderation (Interaction), Fit as Mediation, Fit as

Matching, Fit as Gestalt, Fit as Profile Deviation, and finally, Fit as Covariation. Each type of measurement requires specific type of data and objectives. For our analysis, three analyses are suitable: fit as moderation, fit as matching, and fit as profile deviation. Studies of Chan (Cragg et al. 2002; Sabherwal & Chan, 2001; Chan et al. 1997; Chan, 1992) show fit as moderation, which examines the interaction as well, is superior to matching in terms of explaining the outcome. Profile deviation complements the moderation type of alignment (Venkatraman 1989b). Therefore, in this analysis we use fit as moderation and profile deviation approaches to measure alignment. In addition, in order to show the robustness of our study and allow readers to compare the different types of measurements, we conducted analysis of fit as matching. These summary tables can be found at the end of the analysis section and in Appendices (Appendix I).

3.6 Mapping between Strategy Attributes and Profiles

Alignment with profile deviation requires profiles and attributes about ERP and business strategies. The profiles for this study have been developed based on careful examination of previous literature about Miles and Snow Typology, Porter's typology and several studies from related literature (i.e., Sabherwal & Chan, 2001; Doty et al. 1993; Segev 1989; Zajac & Shortell, 1989; Camillus & Lederer, 1985). Ideal profiles for both ERP and business are the elements of two typologies by Miles and Snow (1978), and Porter (1980). This approach is similar to Sabherwal and Chan's approach while we also used Segev's suggestion about the combination of these two typologies.

The attributes of business strategy are defensiveness, risk aversion, aggressiveness, pro-activeness, analysis, and futurity (Venkataramanan, 1989). While Sabherwal & Chan (2001) match these attributes with only three of the business strategy profiles of defenders, prospectors, and analyzers, we use the same attributes with an extension of five business strategy profiles suggested by Segev (1989). Therefore, the business strategy profiles used for this study are defenders, differentiations, analyzers, cost leaders, and prospectors. We have used differentiation and cost leader but have not used differentiation focus and cost focus since differentiation and differentiation focus, and cost leader and cost focus are on the same level in terms of consistency. As mentioned earlier in text, the only difference between them is the focus: while differentiation and cost leader have a broad focus (such as industry), differentiation focus and

cost focus have more limited focus (such as a specific segment in product line, specific consumer group, etc.). For example, a prospector (a company, whose business strategy is prospector) would be very high on aggressive and proactive attributes; meaning a prospector company would be expected to do extraordinary acts such as reducing financial ratios, prices, profitability, etc. in order to dominate the market and these companies, in addition, would be willing to develop new products and services, always in search of new opportunities, and even acquiring businesses. This is not surprising when considering the opportunistic and flexible characteristics as well as willingness to be the first in new products and services of prospector organizations. At the same time, the prospector companies would be medium on analysis and futurity attributes. In other words, the prospectors companies would do detailed analysis for forecasting future with the effective use of ERP. However, although they use these activities, their focus and application on these would be at a medium level. Conversely, prospector companies would be showing much less characteristics of defensiveness and risk aversion. Prospector companies would not be interested in defending their market position and avoiding risks for their business more than other business attributes. A defender organization would be very interested in defending their market position, therefore focusing on quality, avoiding business risk as much as possible, and doing analysis at a medium level while heavily relying on forecasts; therefore be very high on defensiveness, risk aversion, and analysis. In addition, defenders would not be interested in developing new products, or acquiring new business (therefore very low on pro-activeness). Table 19 shows the mappings among business strategy profiles and business strategy attributes.

Table 19 Mapping of Business Strategy Profiles and Business Strategy Attributes (Adapted and Modified with Permission by Sabherwal & Chan, 2001, p.15)

Business Strategy Attrib.	**Prospectors**	**Differentiation**	**Analyzers**	**Cost Focus / Leadership**	**Defender**
Defensiveness	Very Low	Low	Medium	High	Very High
Risk Aversion	Very Low	Medium	Very High	Very High	Very High
Aggressiveness	Very High	High	Medium	Medium	Medium
Proactiveness	Very High	High	Medium	Low	Very Low
Analysis	Medium	High	Very High	High	Medium
Futurity	Medium	Medium	Medium	High	Very High

3.7 ERP Strategy

Enterprise systems, therefore ERP systems provide integration, flexibility, efficiency, process orientation and effectiveness to organizations. After detailed examination of literature, we have grouped the ERP strategy attributes as operational support, market information, organizational purposes, strategic decision support, and managerial purposes (Jutras, 2007; Poston & Grabski, 2000; Shang & Seddon, 2000; Su & Yang, 2010). In this study, ERP strategy refers to strategic and supportive use of ERP systems to help the organization to gain or improve operational excellence, customer and supplier intimacy, competitive advantage, product/service development, improved decision making, and meet the strategic objectives of business. Based on Luftman's (2004) argument, we can say the main goal of ERP strategy is to make sure the decisions made by ES management either enables or drives the business strategy.

Based on the literature (i.e., Su & Yang (2010), Chand et al. (2005), Al-Mashari et al. (2003), Grant (2003), Sabherwal & Chan (2001), Ali (2000), Shang & Seddon (2000), Bowersox, Closs, & Stank (1999)) ERP strategy attributes or ERP strategic support types that are built based on the benefits of ERP can be categorized as follows:

- Operational: From an operational perspective, organizations use ERP in order to support and improve their transaction-processing ability, improve organizational information quality and visibility, enhance decision support capabilities, increase productivity, customer service, control their expenses regarding business operations, order entry and fulfillment processes in manufacturing and production functional area, and improve their operational efficiencies. During the operational use/support of ERP, organizations gain additional benefits from their systems such as reduction in operational costs, cycle times, level of inventories, as well as significant reduction in errors through standardization of cross-functional procedures.
- Market Information: Use of ERP for market information purposes allows organizations to improve effectiveness, processing power across the organizational network and ERP infrastructure capability. Meanwhile organizations benefit from several reductions in ERP costs and the amount of system challenges. Market information helps organizations to develop competencies, even ERP competencies, through standardization of operations (including ERP operations). This attribute contributes to organizations' attempts to keep

or improve their competitive capabilities and market position that will come through satisfying customers and searching each avenue to accomplish that goal. In addition, with the support of market information attribute, organizations can minimize their operational and commercial risks regarding their businesses.

- Strategic: Use of ERP in order to support strategic components of the business helps organizations to adapt to changes, support their business growth (strategic alliances, mergers, acquisitions), supply chain (including e-business), and consolidation of ERP infrastructure across business units, to have integrated and real time information. This way, organizations can build and maintain external linkages and business innovations. Organizations using their ERP with strategic purposes can improve their market opportunities, responsiveness to competitive pressure through a flexible structure, and improved business planning, and decision and forecasting capabilities. These organizations are open to use of technologies that will give them advantage over others.
- Managerial: Managerial use of ERP allows organizations to improve and monitor resource management, performance, decision making and planning, quality management and control, market value and share through creativity and adaption of relevant technologies. Organizations can expand their operations through these characteristics (step by step detailed planning, improved resource management, use of relevant technology, etc.).
- Organizational: Use of ERP to support organizational components allows organizations to create a platform for business process and partner (i.e., supplier) integration and build common vision. These organizations can easily support operational configurations for diverse market segments and organizational change, introduce of best practices, and rationalize their organization. While organizational support of ERP facilitates business learning, organizations can improve coordination and communication among business units, capabilities to facilitate segmental strategies and processes, as well as information sharing.

Based on the literature (Su & Yang, 2010; Jutras, 2007; Poston & Grabski, 2000; Shang & Seddon, 2000; Doty et al. 1993; Segev, 1989; Venkataramanan, 1989; Camillus & Lederer, 1985) and aforementioned characteristics of ERP, business strategy profiles and attributes, we

have modified the Sabherwal & Chan (2001)'s mapping. Therefore, we can say that for Prospectors, ERP for Flexibility will be appropriate with Strategic Decision Support; for Differentiators, ERP for Process Orientation will be appropriate with Managerial Support; for Analyzers, ERP for Integration will be appropriate for Organizational Support; for Cost Leaders, ERP for Effectiveness will be suitable for Market Information Support; and finally for Defenders, ERP for Efficiency will be suitable for Operational Support. For example, literature supports a prospector company with its new market opportunity seeking, flexibility focus, intention to be the first one to develop new products or services, and lack of formalization, they are classified as very high in improving effectiveness, standardization of cross-functional procedures (market information attribute), improving the market opportunities, supporting growth (strategic decision support attribute); medium in improving their business processes, and source management (managerial attributes), improving coordination among business units (organizational); and low in reducing the operational cost (operational) (Su & Yang, 2010; Jutras, 2007; Poston & Grabski, 2000; Shang & Seddon, 2000; Venkataramanan, 1989; Segev, 1989; Camillus & Lederer, 1985). On the other hand, a defender who focuses on being efficient, lowering cost, improving quality, planning in long term business, etc. would be very high on improving operational efficiency and reducing operational cost (operational attribute), facilitate business learning, improving coordination and communication among business units (organizational), improving market opportunities (strategic decision support attribute), and improving business processes (market information attribute), while only medium in improving effectiveness and reducing ES cost (market information attribute) (Su & Yang, 2010; Jutras, 2007; Poston & Grabski, 2000; Shang & Seddon, 2000; Doty et al. 1993; Venkataramanan, 1989; Segev, 1989; Camillus & Lederer, 1985). The mapping between ERP profiles and attributes are shown in Table 20 (Adapted and Modified from Sabherwal and Chan (2001) with Permission).

Table 20 Mapping of ES Profiles and ES Attributes

	Prospectors	**Differentiation / Focus**	**Analyzers**	**Cost Focus / Leadership**	**Defender**
ES Strategy Attributes	***ES for Flexibility***	***ES for Process Orientation***	***ES for Integration***	***ES for Effectiveness***	***ES for Efficiency***
Operational	Very Low	Low	Medium	High	**Very High**
Market Info	Very High	Very High	Very High	**Very High**	Medium
Organizational	Medium	High	**Very High**	Very High	Very High
Strat. Dec. Sup.	**Very High**	Very High	Very High	Very High	Very High
Managerial	Medium	**Very High**	Very High	Very High	Very High

The final step for calculating the alignment as profile deviation is the mapping between ERP and business strategy profiles. Table 21 reveals the mapping regarding which type of attribute is compatible with which profile. This table is crucial for the wording of hypotheses of this study (Adapted and Modified Sabherwal and Chan (2001) with Permission).

Table 21 Levels of Alignment between ES and Business Strategy Profiles

ES for	**Prospectors**	**Differentiations**	**Analyzers**	**Cost Leaders**	**Defenders**
Flexibility	High	Low	Low	Low	Low
Process Orientation	Low	High	Low	Low	Low
Integration	Low	Low	High	Low	Low
Effectiveness	Low	Low	Low	High	Low
Efficiency	Low	Low	Low	Low	High

Source: The table has been developed based on Sabherwal & Chan (2001), Segev (1989), and Doty et al. (1998).

The hypotheses of the study related to ERP strategy, business strategy attributes and profile and business performance are as follows:

Hypothesis 4: For Prospectors, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Flexibility.

Hypothesis 5: For Differentiators, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Process Orientation.

Hypothesis 6: For Analyzers, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Integration.

Hypothesis 7: For Cost Leaders, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Effectiveness.

Hypothesis 8: For Defenders, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Efficiency.

3.8 Objectives of the Study

This study examines alignment between business strategies and Enterprise Resource Planning (ERP) systems rather than focusing on whole Information Systems (IS) or Enterprise Systems (ES) in order to broaden our understanding about alignment concept. This study comprises three key objectives: (1) Extend the strategic alignment concept by applying the combination of Miles and Snow and Porter's typologies that will be mapped to strategy attributes as part of strategy; (2) Operationalizing the constructs and identifying the relationship between alignment, strategic ERP flexibility, and performance; and (3) Finally examine the model through fit as moderation and profile deviation (Venkatraman, 1989).

We can write our hypotheses from two common perspectives (Drazin & Van de Ven, 1985; Fry and Schellenberg 1984): congruent approach and contingency approach. In congruent approach, hypotheses are formed from the variables with an unconditional association (i.e., the more the ERP and business are aligned, the higher the performance, etc.). Unlike congruent approach, contingency approach is more complex in that it hypothesizes the relationship between one dependent variable and more than one independent variables (i.e., ERP and business strategies interact to effect the performance) (Drazin & Van de Ven, 1985).

Fit is the critical element of contingency approach. The most common approaches to fit are selection (assumption), interaction (bivariate), and systems (Drazin & Van de Ven, 1985) (Van de Ven & Drazin, 1985). Selection approach accepts fit as a prerequisite for structure and context. Drazin and Van de Ven (1985) define interaction and systems approaches of fit as: "the interaction of parts of organizational context-structure factors; it affects performance" and "the internal consistency of multiple contingencies and multiple structural characteristics; it affects performance characteristics" (p. 515). Selection approach requires the examination of context-structure relationship to assess fit and does not require a dependent variable (Chan et al. 1997; Drazin & Van de Ven, 1985). Interaction approach focuses on the effects of the interaction between structure and context on performance in terms of the variations. Models are analyzed through disaggregation of the elements of theory and their interaction with performance. While the advantages of integration include more detailed and accurate analysis, disadvantages include

the reductionism and lack of capturing the whole aspect of the theory as well as being unstable because of their non independent structure with other constructs or elements of constructs. In addition, Chan et al. (1997) argue based on Venkatraman's (1989) study and state "This lends us support to the view that examining isolated components of strategy and performance can be misleading" (p. 139) regarding the disadvantages of bivariate approach (see Table 22).

Table 22 Approaches of Fit (Drazin & Van de Ven, 1985, p.515)

Interpretation of Fit in the Selection, Interaction, and Systems Approaches to Structural Contingency Theory			
Views, definitions, and test methods	Selection	Interaction	Systems
Initial Views			
Definition	*Assumption:* Fit is assumed premise underlying a congruence between context and structure.	*Bivariate interaction:* Fit is the interaction of pairs of organizational context-structure factors; it affects performance.	*Consistency analysis:* Fit is the internal consistency of multiple contingencies and multiple structural characteristics; it affects performance characteristics.
Test methods	Correlation or regression coefficients of context (e.g., environment, technology, or size) on structure (e.g., configuration, formalization, centralization) should be significant.	Context-structure interaction terms in MANOVA or regression equations on performance should be significant.	Deviations from ideal-type designs should result in lower performance. The source of the deviation (in consistency) originates in conflicting contingencies.
Current-Future Views			
Definition	*Macro selection:* Fit at micro-level is by natural or managerial selection at macro-level of organizations.	*Residual analysis:* Fit is conformance to a linear relationship of context and design. Low performance is the result of deviations from this relationship.	*Equifinality:* Fit is a feasible set of equally effective, internally consistent patterns of organizational context and structure.
Test methods	Variables subject to universal switching rules should be highly correlated with context. Particularistic variables should show lower correlations.	Residuals of context-structure relations regressed on performance should be significant.	Relationship among latent context, structure, and performance constructs should be significant, while observed manifest characteristics need not be.

Literature suggests since interaction approach is capable of detecting fit among certain and limited pairs of context-structure relationship (Drazin & Van de Ven, 1985; Miller, 1981) and isolated components (Chan et al. 1997), relying solely on interaction approach would be not

relevant (Drazin & Van de Ven, 1985; Pennings, 1975). On the other hand, systems approach allows more comprehensive multi-variate analysis and holistic approach for observing the patterns in dimensions. The suggested analysis for selection approach are correlation and regression analysis; for interaction approach are two-way ANOVA, regression analysis as well as calculations of deviations of residual scores from regression line; and finally for systems approach is calculation of profile deviation and pattern analysis (Drazin & Van de Ven, 1985). In this study, we followed Chan et al. (1997) methodology and adapted both approaches. As the authors state, using systems approach allows us to examine "firms' overall profiles" while using bivariate approach allows us to examine "specific dimensions of interest" (p.136). In the systems approach, "relationships between complex constructs are meaningful" while in bivariate approach "the components or dimensions, of these complex constructs can be disaggregated and relationships between these can be meaningfully tested" (Chan et al. 1997, p.135). Figure 24 shows the required concepts for designing a research on alignment.

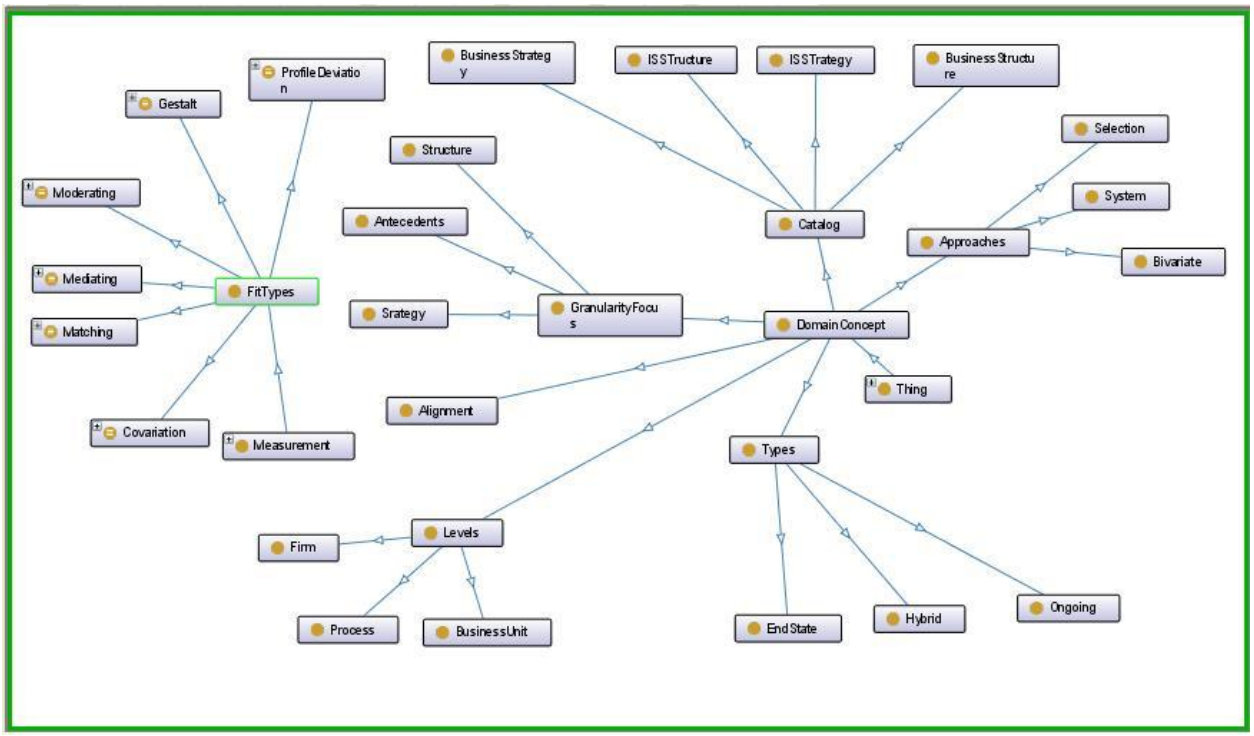

Figure 24 Decision Process for Building a Research about Alignment

Our primary attempt in this study is to use the systems approach. However, since both approaches provide useful information regarding the relationships among our constructs, in this

study, we use both systems approach and bivariate approach to test our hypotheses. After conducting the initial tests such as factor analysis, correlations, reliabilities, and validities, we will conduct each analysis such as Partial Least Square (PLS), mediation effect (regression analysis for Sobel test), ANOVA, correlations and regression analysis that we conduct from systems approach perspective, for the bivariate approach perspective as well. Figure 25 shows the analysis conducted in this study (excluding the design level analysis).

Figure 25 Summary of Analysis in the Study

Management needs to consider the ERP strategy that will support and fit to their organizations' strategic orientation when they are conducting their ES planning. This study with its instrument will provide the quantification for evaluation of business and ERP strategies, and ERP strategic fit. In addition, organizations can enhance their competitiveness to assess their business and ERP strategies (Chan, 1992) through this study.

4 Chapter: Research Methodology

Survey research is the appropriate method for collecting primary data pertaining to "describe, compare, or explain individual and societal knowledge, feelings, values, preferences, and behavior" (Fink, 2008, p.1; Fink, 2002). According to Salant and Dillman (1994), the objective of surveys is "to find out what percentage of some population has a particular attribute or opinion" (p.9). The most appropriate strategy based on the research questions, objectives, and foreseen analysis, is the quantitative data analysis in which data will be collected through questionnaire surveys. In addition, while measuring alignment, Reich and Benbasat (2000) suggest that researchers should examine the perceptions pertaining to the alignment rather than the structure of the artifact. The authors state "... one should investigate the contents of the players' minds: their beliefs, attitudes, and understanding of these artifacts" (p.83).

The instrument for this study has been developed based on Venkatraman's (1985) study of Strategic Orientation of Business Enterprise (STROBE) and be mirrored for the ES strategy construct with a similar perspective of Chan (1992) and Cragg et al. (2002). Within this study, the appropriate aspects of works of Sabherwal & Chan (2001), Chan (1992), Venkatraman (1985), Segev (1989) (including Miles and Snow's (1978) and Porter's (1980) typologies), Chan (2002) and Luftman et al. (1999) have been used as well as the dominant perspectives of fit, which are fit as moderation and fit as profile deviation by Venkatraman (1989).

As suggested by Dillman (2007), the questionnaire has been refined through four stages: (i) reviewing the instrument by knowledgeable colleagues/analysts; (ii) conducting an interview with several participants in order to evaluate cognitive and motivational qualities; (iii) conducting a small pilot or pre test; and (iv) final check. In our case, the initial instrument was sent to several PhD students, faculty, Post-Doc researchers as well as several ES professionals knowledgeable about the strategy of organization and their business unit. Based on feedbacks, reviews, and survey data collected from the sample, the instrument was refined. A small number of individuals were interviewed regarding the questionnaire for additional refinement. The majority of changes were pertaining to rewording and sorting of questions, as well as elimination of several questions. In addition, a review of literature regarding the applications of Venkatraman's instrument has helped us to reduce the number of questions in the initial

instrument. Since the majority of the instrument (with minor changes) has been tested and validated by several researchers (Chan, 2002; Cragg et al. 2002; Sabherwal & Chan, 2001; Hale & Cragg, 1996; Chan, 1992; Venkatraman, 1985) as well as the high cost of collecting data (Davis, 1989; Bohmstedt, 1970), a detailed pilot test, which is a full-fledged miniature version of the whole study, has been skipped at this stage. However, a small pre test has been conducted to make sure respondents understand the questions correctly and their responses are as expected based on literature. In the small pre-test of our study, we conducted several analysis regarding internal consistency (Cronbach's Alpha), reliability (composite reliability and average variance extracted), unidimensionality and convergent validity tests, and discriminant validity (correlations) as Menor and Roth (2007) suggested. As the final step, after the modifications, the instrument was sent to several faculty and PhD students for a final check. Figure 26 represents the analysis domain of this study.

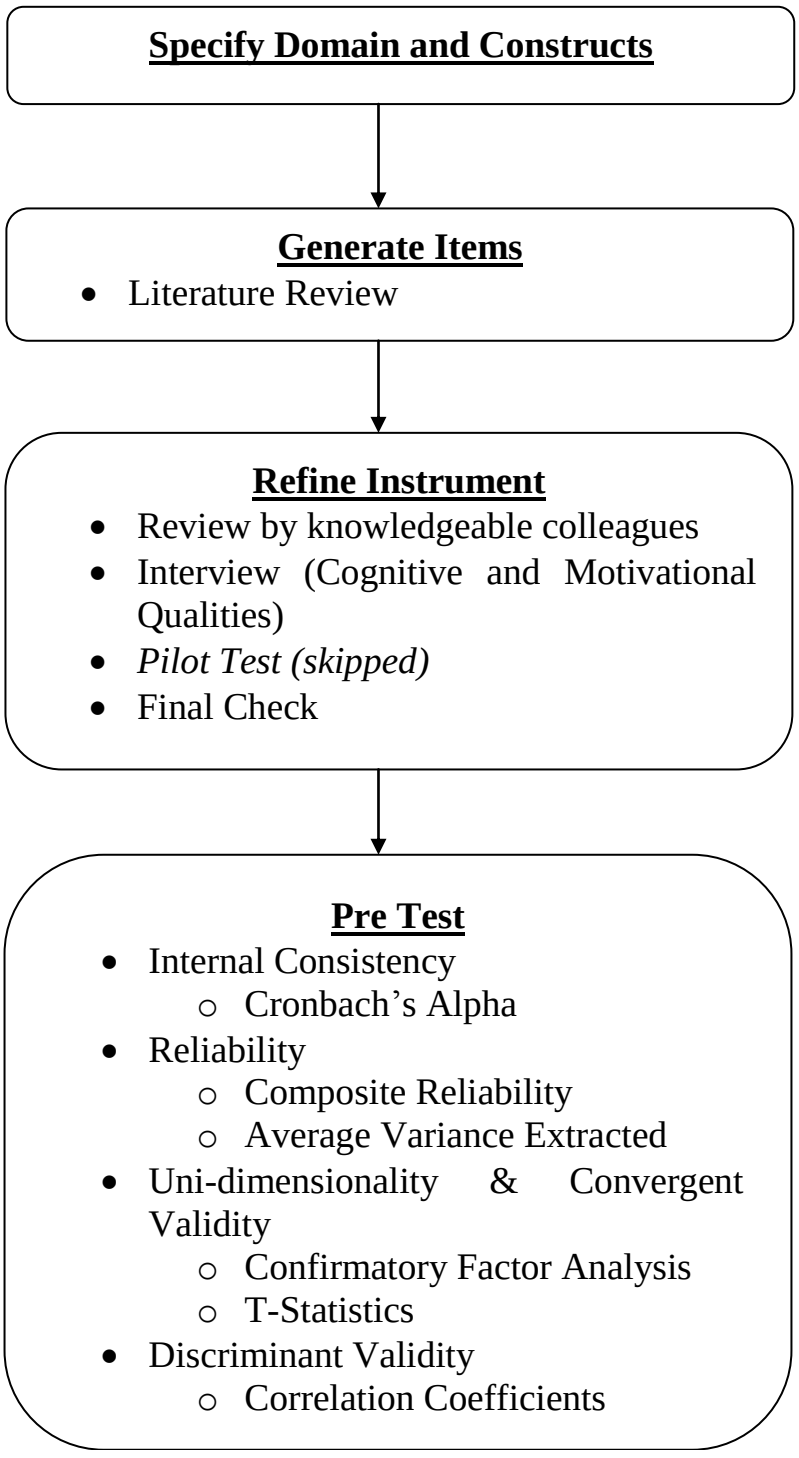

Figure 26 Analysis Domain of the Study

Note: Modified from Dillman (2007) and Menor and Roth (2007, p.831)

The questionnaires were sent to companies in North America from several industries such as manufacturing and service industries. The survey questions are closed-ended questions with a five-point Likert scale. The survey questionnaires were sent to approximately 1000 companies; however, several of them were returned due to change of address, not accepting mail without specific names, not participating in surveys because of company policy, etc. Meanwhile, we uploaded the survey on a web site (www.surveymethods.com) so participants could choose sending their responses through either mail or webpage (Croteau, Dyer & Miguel, 2010). One hundred and fourteen surveys were returned. However, because of incomplete or missing data, we had to eliminate 22 of the questionnaires. Therefore, we had 92 usable surveys for analysis. Some of the main reasons for the relatively small sample size are time constraints, number of requested questionnaires from the organization, the number of questions in the questionnaire (Assael & Keon, 1982), privacy concerns, internal policy and limitation regarding answering surveys, not having an enterprise system or not having an experience about it. The instrument is in Appendix J-L.

This study focuses on realized strategy, in terms of both ERP and business, rather than the planned strategy. Chan et al. (1997) state this approach "challenges managers to think not only in terms of their planned IS [ES] portfolio and infrastructure investments, but to explicitly assess and reckon with emergent IS [ES] strategy...; realized and intended IS [ES] strategies frequently diverge" (p.142). Therefore this approach focuses on the current system and perceptions about it.

The main proposed model is composed of five constructs: business strategies (defined as Strategic Orientation of Business Enterprise (STROBE) by Chan (1992)), Enterprise Systems strategies (similar to definition of Strategic Orientation of Enterprise Systems (STROES) by Chan (1992)), alignment or fit, strategic ERP flexibility, and finally business performance. The conceptual model in Figure 24 depicts the relationship among these constructs. The conceptual model illustrates business strategy, ES strategy, and their alignments have an impact on business performance. In addition, ERP flexibility has direct and indirect effects on business performance as well.

This study is primarily an exploratory one and aims to bridge the gap on several studies regarding alignment. With that purpose in mind, this study brings different business strategies that have proven to successfully have an impact on alignment or performance, together. Before strictly using one theory, that somehow has had conflicting results; we used an exploratory approach and tested the relationship with the constructs. Therefore, after testing the main model, we introduced the flexibility concept to the model and examined the relationship between strategic ERP flexibility and alignment, and performance. Figure 27 reveals the main theoretical model as well as three hypotheses of this study.

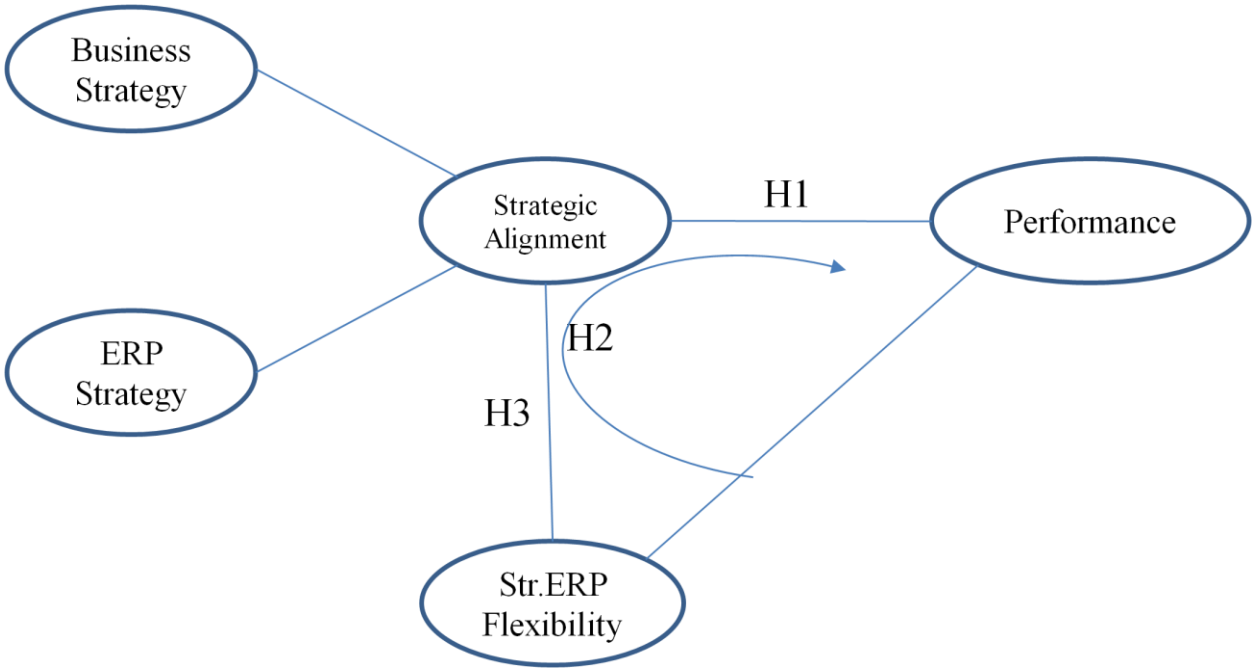

Figure 27 Theoretical Model as Part of a Structural Equation Model

Figure 28 represents the research model regarding alignment. In this study, I have measured alignment through moderation and profile deviation perspectives since they are recommended by researchers as the strongest measurements of alignment. In addition, I have used the alignment construct in our analysis where I have conducted them from systems approach and bivariate approach in order to test our hypotheses. Although literature states that alignment as matching is a weak measurement of alignment compared to moderation, I attached the results of alignment as matching to the appendices (Appendix D and I). In addition, regarding the discussions of profile deviation, we will follow literature and use theoretical perspective

rather than empirical or analytical perspective because of their limitations. However, I have attached the empirical analysis in appendices (Appendix C), too.

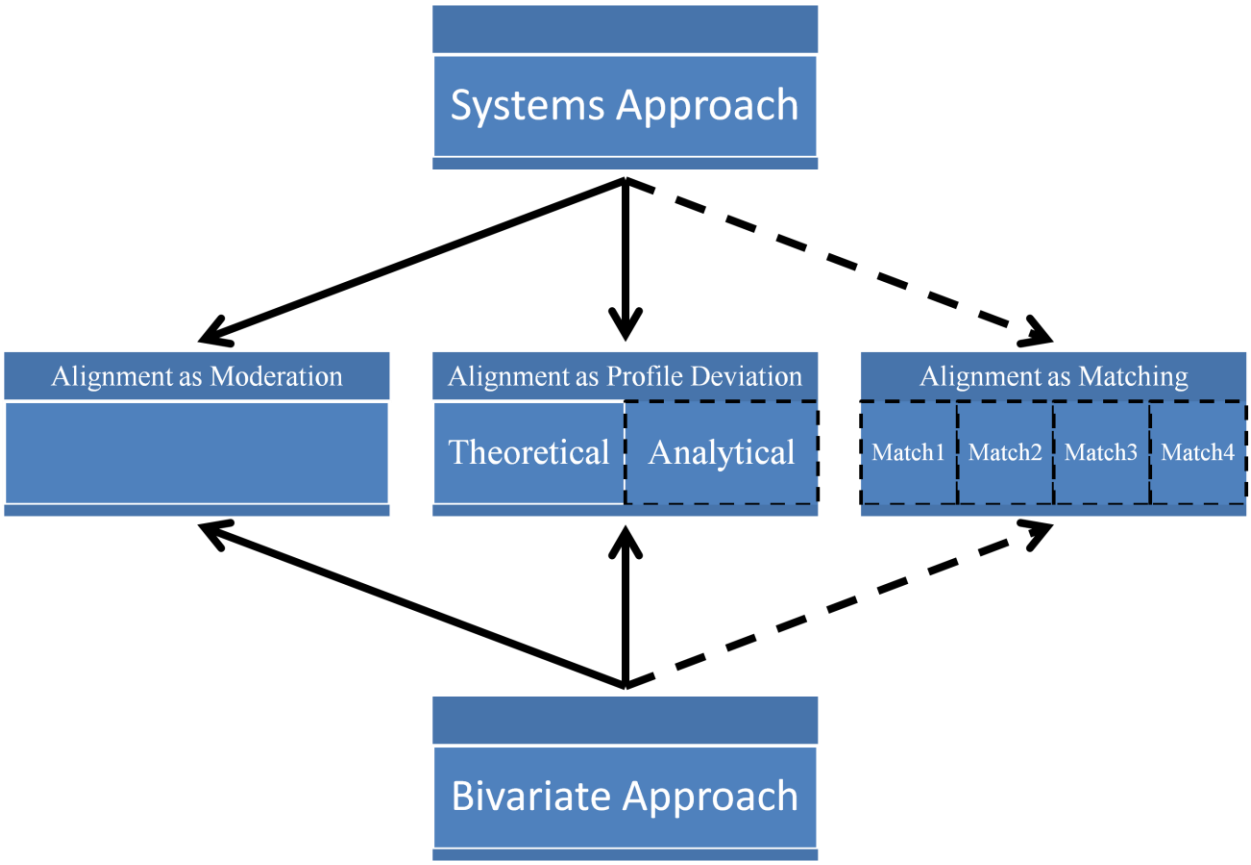

Figure 28 Alignment Research Model

Notes:

Match1: Fit as Matching with Absolute Difference
Match2: Fit as Matching with Signed Difference
Match3: Fit as Matching with Squared, Summed Difference
Match4: Fit as Matching with Summed Interaction

4.1 Analysis

Several studies examine alignment in ES literature from different perspectives. The variety of these perspectives plays a crucial role on determining the type of alignment measure. For example, as discussed above, type of alignment (Business Alignment, ES Alignment, Strategic Alignment, Structural Alignment, Cross Dimensional Alignment, Alignment Mechanisms), whether alignment is an output or end state, or a dynamic process or a hybrid, the type of approach (holistic therefore system, or dimension-specific therefore bivariate, or

selection) (Drazin & Van de Ven, 1985), and level (whether process, business unit, or firm) would (when appropriate) determine the way and methods for measuring alignment. In this study, we examine firm level strategic alignment from a holistic perspective where alignment is a hybrid state. We have developed the instrument based on these perspectives. Therefore, the appropriate alignment measurement would be either fit as matching, fit as moderation, or fit as profile deviation (Venkatraman 1989) for our study. As mentioned before, "the 'systems' view suggests that relationships between complex constructs are meaningful, whereas the 'bivariate' view suggests that the components, or dimensions, of these complex constructs can be disaggregated and relationships between these can be meaningfully tested" (Chan et al. 1997, p. 136). The authors also state results of bivariate analysis at the lower-order level were "unstable" since the one-dimensional constructs were not independent (p. 139). Considering the fact systems approach is superior to bivariate approach and moderating approach is superior to matching approach (Sabherwal & Chan, 2001; Chan et al. 1997; Chan, 1992) and profile deviation complements the moderating approach (Venkatraman 1989), we have adapted fit as moderating and profile deviation under holistic approach in this study as the major unit of analysis.

As Venkatraman (1989) stated, both theoretical and methodological reason should exist behind the reasoning and choosing the appropriate method for alignment. In this study, alignment is related to supportive use of ERP with business strategies and objectives. The objective of this supportive use is to enhance business performance. Therefore, we can mention a synergy here between two strategies. As Schoonhoven (1981) mentions "when contingency theorists assert there is a relationship between two variables... which predicts a third variable…, they are stating that an interaction exists between the first two variables" (p.351, as cited by Venkatraman (1989)). Therefore, synergy can be shown as the impact of individual elements and the collaborative impact or interaction of these two elements. This type of theory is consistent with alignment as moderation. On the other hand, alignment as matching is another appropriate method for this study. This type of fit "between two variables is developed independent of any performance anchor" (Venkatraman, 1989, p.430). This requires two elements such as ERP and business strategy for the measurement. When we need a measurement of alignment based on two variables or constructs, alignment as matching method can be adopted. Finally, the third method

appropriate to this study is alignment as profile deviation. This type of alignment requires an ideal profile and the distance between profile elements or dimensional elements and the ideal profile. Examining business and ERP strategy gives us the business and ERP strategy profiles. Multidimensional comparison of these profile elements (business strategy profiles such as prospector, cost focus, analyzer, differentiation, and defender in this case) with the ideal profile developed either empirically or theoretically, gives us the level of alignment that will have an impact or relationship with performance.

In this study, we have utilized SPSS version 17, AMOS 6, SAS 9.0, and WarpPLS, a Structured Equation Modeling (SEM) based statistical tool to conduct the analysis. Partial Least Squared (PLS) that is an SEM based tool has been used in order to analyze collected data. PLS is a second-generation multivariate method capable of identifying both linear and nonlinear relationships among the variables/constructs. PLS is variance based, prediction oriented, nonparametric that has the ability to model in both formative and reflective relationship and accurate prediction capability, with even complex models (Chin & Newsted, 1999, p.314). In addition, PLS and WarpPLS provide the estimated coefficients of the paths as well as the regression between latent variables/constructs. PLS is accepted to be superior to LISREL that is factor-based covariance fitting method in exploratory research (Gopal, Bostrom, & Chin, 1992). Another advantage of PLS and WarpPLS is that they simultaneously apprise the theoretical and measurement model (Chin, Marcolin, & Newsted, 2003). PLS has superiority under several conditions: i) predicting a model; ii) lack of clearly defined theory or measures; iii) large number of indicators; and, iv) non-normality and small sample size (Chin & Newsted, 1999; Barclay et al. 1995; Fornell & Larcker, 1981). In ES literature, different researchers have stated different amounts of sample size as minimum sample size; therefore, there is no agreed minimum sample size. The minimum sample size for PLS analysis, as a rule of thumb, is five (Bahli & Büyükkurt, 2005; Gopal et al. 1992) or ten times (Chin & Newsted, 1999), as a more conservative approach, "the maximum number of paths aiming at any construct in the model (including the paths of formative indicators)" (Huth, 2008, p. 92). More cases and indicators would provide the estimate accuracy rather than the sample size in PLS (Chin & Newsted, 1999). "Overall, the results show that the PLS approach can provide information about the appropriateness of indicators at sample

size as low as 20. Furthermore, it performed better than the simple summed regression approach with four or eight indicators" (Chin & Newsted, 1999, p.335).

The respondents of the survey questionnaire were from North America. The mail surveys were sent to over 1000 companies with contact names found from several databases (i.e., Industry Canada Site, Lexis Nexis, and Hoovers). Many of the surveys were returned since either the company had changed its address or they do not participate / accept survey questionnaires. Therefore, the return rate was around 9%. The characteristics of respondents are summarized in Tables 23 and 24.

Among the participants, 12 of them were CIOs, 37 of them were IT managers, six reported themselves as users (*) and 37 of the respondents were "Other" including CEO, CFO, and Managers (see Table 23).

Table 23 Demographics about Job Title

	Categorization	**Frequency**	**Percent**
Job Title	CIO	12	13
	IT Manager	37	40.25
	User*	6	6.50
	Other (CEO, CFO)	37	40.25

*: Six of the respondents marked as user. However, these respondents also explained that they are also a kind of manager (i.e., Supply Chain, Software). Therefore, we can report these respondents under "Other", where they refer to a managerial positions related to IT.

Most of the companies, of which the data have been collected, can be considered as big companies since their annual sales are more than (US) $10 million. There were only seven companies whose sales were less than half a million dollars, eight of them were having sales between a half and one million dollars, and about 12 of the companies' sales were between one million and $10 million dollars (see Table 24).

Table 24 Demographics about Sales Volume

	Categorization	Frequency	Percent
Sales Volume	100.000.000 plus	42	45.7
	10.000.000-99.999.999	23	25.0
	1.000.000-9.999.999	12	13.0
	500.000-999.999	8	8.7
	Less than 500.000	7	7.7

Considering that participation was not very high, we investigated the possibility of non-response bias through the examination of difference on two waves, early and late returns, of surveys returns (Lambert & Harrington, 1990; Armstrong & Overton, 1977). One type of non-response bias analyses includes considering the later wave of responses as non-response compared to earlier wave of responses (Bose, 2001). Therefore, in our analysis, survey responses were divided into two groups as early returns and late returns based on the return status. The sample sizes for these two groups were 60 as early respondents and 32 as late respondents. After performing t-test for differences in the means of early and late responses with randomly selected 15 survey items, we did not find any significant difference among these survey items. Therefore, our results indicate that non-response bias is unlikely to be a problem or concern for internal validity in this study. Measurement items are in Appendix A.

There is a strong theory behind business strategies and their attributes in the literature. However, in order to make sure our data is consistent with the previous theory; first Exploratory Factor Analysis (EFA) has been conducted to explain the observed correlation and/or covariance structure among the items by grouping them into a number of factors. Another benefit of using EFA was to identify and eliminate the poorly loading items. Following the EFA, Confirmatory Factor Analysis (CFA) has helped us to confirm our structure of factors. In a factor analysis, as a rule of thumb, 0.5 or higher loadings are required (Hair, Black, Babin, Anderson, & Tatham, 2006). Based on the guidelines that Hair et al. (2006) provided, the loadings should be close to 0.55 with the sample size around 100. Kaiser-Meyer-Olkin (KMO) statistics that indicate the sampling adequacy should be 0.6 or above so that data is suitable for factor analysis. Our results indicate the KMO value as 0.797 and Bartlett's test of sphericity (Chi Square) as 630.418 and significant (at 0.01 level) stating that factor analysis can be conducted. In addition, the Total Variance Explained is 63.323% for our analysis. Our results of factor analysis reveal the loadings

of all items were above the threshold value of 0.5 stating that the discriminant validity of the instrument has been demonstrated. Table 25 also reveals information regarding the reliability of measurement. Cronbach's alpha and composite reliability are two measurements to assess the reliability (Fornell & Larcker, 1981; Nunnaly, 1978). The acceptable value for Cronbach's alpha is 0.7 while 0.6 is marginally acceptable (Hair et al. 2006). The threshold for composite reliability is 0.7. Our results show both Cronbach's alpha and composite reliability measurements are above the required levels. The minimum reliability measurement of Cronbach's alpha is 0.649 and the largest value is 0.812; while the minimum composite reliability measurement is 0.798 for aggressiveness and maximum value is 0.842 for defenders. Since these measures are above the threshold, our results indicate an acceptable reliability for the measurement model (see Table 25).

Table 25 Exploratory Factor Analysis and Reliabilities for Business Strategy Types

Business Strategies	**Variables**	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Cronbach's Alpha**	**CR**
Defensiveness	DEFF1	***0.741***	-0.003	0.151	0.162	0.100	***0.821***	***0.842***
	DEFF2	***0.763***	0.196	0.051	0.015	0.113		
	DEFF3	***0.741***	0.249	0.200	-0.112	0.075		
	DEFF4	***0.803***	0.173	0.111	-0.066	0.070		
	DEFF5	***0.534***	0.252	0.383	-0.049	-0.0112		
Analysis	ANLY1	0.232	***0.539***	0.189	-0.380	0.231	***0.804***	***0.843***
	ANLY2	0.152	***0.694***	0.086	0.138	0.170		
	ANLY3	0.346	***0.742***	-0.040	0.054	0.192		
	ANLY4	0.280	***0.720***	0.058	-0.122	0.138		
	ANLY5	-0.031	***0.794***	0.169	0.153	0.127		
Aggressiveness	AGGRS1	0.316	0.131	***0.686***	-0.160	-0.034	***0.649***	***0.798***
	AGGRS2	0.126	0.148	***0.792***	-0.073	0.0360		
	AGGRS3	0.085	-0.005	***0.658***	0.092	0.161		
Risk Aversion	RSKAV1	-0.029	0.031	-0.117	***0.785***	-0.155	***0.662***	***0.785***
	RSKAV2	0.185	0.034	0.399	***0.644***	0.009		
	RSKAV3	-0.064	0.071	-0.120	***0.815***	0.108		
Futurity	FUTUR1	0.048	0.271	-0.072	0.152	***0.639***	***0.723***	***0.828***
	FUTUR2	0.090	0.117	0.198	-0.102	***0.820***		
	FUTUR3	0.103	0.207	0.052	-0.114	***0.823***		

Notes:

Method: Principal Component Analysis with Varimax Rotation, Kaiser Normalization
DEFF: Defensiveness
ANLY: Analysis
AGGRS: Aggressiveness
RSKAV: Risk Aversion
FUTUR: Futurity

Furthermore, the Corrected Item-Total Correlations (CITC) has been examined for each item on each factor. CITC shows the correlation between each item and the combined score of other items in the same factor. This method helps to assess the goodness of internal consistency of the composite score with all items in the same factor. While values less than 0.3 indicate a poor correlation, values over 0.3 indicate good internal consistency (De Vaus, 2002). The fourth column in Table 26 shows the "Cronbach's Alpha If Item Deleted" values. The values represent the reliability in terms of Cronbach's alpha after the item has been removed from the factor. The higher value of this column than Cronbach's alpha indicates the item can be deleted for better reliability measurement. On the contrary, the lower value (compared to Cronbach's alpha for the factor) means the item contributes to the overall reliability of the factor. Our results indicate all CIRC items are above 0.3 (between 0.519 and 0.700 for defensiveness; between 0.490 and 0.684 for analysis; between 0.330 and 0.540 for aggressiveness; between 0.348 and 0.549 for risk aversion; and between 0.414 and 0.656 for futurity) and all items are useful and contribute to the factor they belong (see Table 26).

Table 26 Corrected Item-Total Correlations and Reliabilities for Business Strategy Types

Construct – Business Strategy	Variables	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Defensiveness	DEFF1	0.556	0.803	0.821
	DEFF2	0.623	0.788	
	DEFF3	0.696	0.761	
	DEFF4	0.700	0.759	
	DEFF5	0.519	0.814	
Analysis	ANLY1	0.490	0.807	0.804
	ANLY2	0.554	0.777	
	ANLY3	0.684	0.738	
	ANLY4	0.649	0.750	
	ANLY5	0.606	0.762	
Aggressiveness	AGGRS1	0.528	0.452	0.649
	AGGRS2	0.540	0.452	
	AGGRS3	0.330	0.729	
Risk Aversion	RSKAV1	0.540	0.470	0.662
	RSKAV2	0.348	0.712	
	RSKAV3	0.549	0.456	
Futurity	FUTUR1	0.414	0.781	0.723
	FUTUR2	0.578	0.594	
	FUTUR3	0.656	0.488	

Notes:

Method: Oblique Rotation
DEFF: Defensiveness
ANLY: Analysis
AGGRS: Aggressiveness
RSKAV: Risk Aversion
FUTUR: Futurity

Following the EFA, Confirmatory Factor Analysis (CFA) has been conducted to confirm the structure of the factors. The results of CFA reveal all items are loading to the expected factors. In addition, the reliabilities for each factor with the selected items are above the threshold values except one factor. The Cronbach's alpha for risk aversion is 0.589, indicating a low reliability. However, considering this value is very close to 0.6 and also composite reliability value is higher than 0.7, we can argue reliability of this factor is also acceptable (see Table for the CFA of business strategy types) (see Table 27).

Table 27 Confirmatory Factor Analysis for Business Strategy Types

Business Strategies	Variables	Factor1	Factor2	Factor3	Factor4	Factor5	Cronbach's Alpha	CR
Defensiveness	DEFF1	***(0.773)***	-0.188	0.023	0.220	0.109	***0.764***	***0.842***
	DEFF2	***(0.741)***	-0.029	-0.149	-0.100	0.006		
	DEFF3	***(0.732)***	0.082	0.010	-0.079	0.007		
	DEFF4	***(0.832)***	-0.003	-0.077	-0.031	0.020		
	DEFF5	***(0.503)***	0.131	0.230	0.020	-0.157		
Analysis	ANLY1	0.023	***(0.476)***	0.130	-0.333	0.096	***0.767***	***0.843***
	ANLY2	-0.039	***(0.720)***	0.023	0.161	0.020		
	ANLY3	0.210	***(0.764)***	-0.153	0.120	0.039		
	ANLY4	0.058	***(0.748)***	-0.080	-0.156	-0.071		
	ANLY5	-0.274	***(0.871)***	0.119	0.163	-0.068		
Aggressiveness	AGGRS1	0.102	0.023	***(0.759)***	-0.089	-0.084	***0.618***	***0.798***
	AGGRS2	-0.101	0.042	***(0.873)***	-0.002	-0.009		
	AGGRS3	-0.001	-0.093	***(0.627)***	0.131	0.133		
Risk Aversion	RSKAV1	-0.068	0.007	-0.103	***(0.725)***	-0.155	***0.589***	***0.785***
	RSKAV2	0.178	-0.046	0.339	***(0.721)***	0.033		
	RSKAV3	-0.055	0.024	-0.129	***(0.810)***	0.132		
Futurity	FUTUR1	-0.076	0.102	-0.095	0.124	***(0.644)***	***0.685***	***0.828***
	FUTUR2	0.011	-0.092	0.110	-0.049	***(0.849)***		
	FUTUR3	0.045	0.013	-0.034	-0.045	***(0.852)***		

Notes:

Method: Oblique Rotation
DEFF: Defensiveness
ANLY: Analysis
AGGRS: Aggressiveness
RSKAV: Risk Aversion
FUTUR: Futurity

Following the factor analysis for business strategy types, we checked how constructs are correlated. Table 28 shows the bivariate correlations among the constructs. Our results indicate defensiveness is positively and significantly correlated with analysis (β=0.492 at 0.01 level), aggressiveness (β=0.454 at 0.01 level), and futurity (β=0.229 at 0.05 level); and analysis is positively and significantly correlated with aggressiveness (β=0.301 at 0.01 level), and futurity (β=0.475 at 0.01 level). In addition, in order to measure discriminant validity, average variance extracted (AVE) values can be used (shown in diagonal, in parentheses). Practically, the square roots of AVE values should be greater than the correlations below of it and on the left side of the item. The AVE value for defensiveness is 0.720; for analysis is 0.722; for aggressiveness is 0.758; for risk aversion is 0.746; and finally for futurity is 0.787.

Table 28 Bivariate Correlations and Square Roots of Average Variance Extracted (AVE) Values for Business Strategy Types

Business Strategy	Defensiveness	Analysis	Aggressiveness	Risk Aversion	Futurity
Defensiveness	**(0.720)**				
Analysis	0.492**	**(0.722)**			
Aggressiveness	0.454**	0.301**	**(0.758)**		
Risk Aversion	0.029	0.013	-0.019	**(0.746)**	
Futurity	0.229*	0.475**	0.187	-0.023	**(0.787)**

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

By following the literature regarding alignment as matching and alignment as moderation, a CFA for the ERP strategy types has been conducted (see Table 29). The results indicate the item loadings are high and the reliability of the instrument is acceptable. The Cronbach's alpha is 0.838 for defensiveness; 0.854 for analysis; 0.592 for aggressiveness; 0.750 for risk aversion; and 0.738 for futurity. In addition, the composite reliability for defensiveness is 0.887; analysis is 0.895; aggressiveness is 0.786; risk aversion is 0.857; and futurity is 0.852. The results show the measurement is reliable.

Table 29 Confirmatory Factor Analysis for ERP Strategy Types

ES Strategies	Variables	Factor1	Factor2	Factor3	Factor4	Factor5	Cronbach's Alpha	CR
Defensiveness	DEFF1	***0.631***	-0.277	0.243	0.216	-0.056	***0.838***	***0.887***
	DEFF2	***0.928***	0.070	-0.203	0.082	-0.135		
	DEFF3	***1.118***	-0.040	-0.044	-0.210	-0.144		
	DEFF4	***0.697***	-0.017	0.068	0.037	0.169		
	DEFF5	***0.483***	0.264	-0.034	-0.112	0.185		
Analysis	ANLY1	0.386	***0.444***	0.157	-0.171	0.074	***0.854***	***0.895***
	ANLY2	-0.283	***1.314***	-0.241	0.058	-0.353		
	ANLY3	-0.052	***1.308***	-0.320	-0.195	-0.045		
	ANLY4	-0.202	***0.590***	0.300	0.171	0.074		
	ANLY5	0.139	***0.357***	0.078	0.142	0.216		
Aggressiveness	AGGRS1	0.291	-0.107	***0.607***	-0.149	0.115	***0.592***	***0.786***
	AGGRS2	0.236	-0.228	***0.473***	0.284	0.074		
	AGGRS3	-0.460	0.292	***1.266***	-0.281	-0.165		
Risk Aversion	RSKAV1	-0.107	0.493	-0.140	***0.608***	-0.211	***0.750***	***0.857***
	RSKAV2	-0.068	-0.308	0.014	***1.051***	0.170		
	RSKAV3	0.157	-0.132	0.108	***0.777***	0.020		
Futurity	FUTUR1	-0.222	0.004	-0.050	0.262	***0.786***	***0.739***	***0.852***
	FUTUR2	0.242	-0.083	0.153	-0.297	***0.759***		
	FUTUR3	-0.004	0.067	-0.086	0.014	***0.885***		

Notes:

Method: Oblique Rotation
DEFF: Defensiveness
ANLY: Analysis
AGGRS: Aggressiveness
RSKAV: Risk Aversion
FUTUR: Futurity

Although loadings higher than 1 might seem non-normal at the first glance, for oblique rotation loadings, the default rotation in WarpPLS for confirmatory analysis, above 1 do not create a threat to the analysis. "Because an oblique rotation is employed by WarpPLS, in some (relatively rare) cases loadings may be higher than 1, which should have no effect on their interpretation. The expectation is loadings, which are shown within parentheses (on the "View indicator loadings and cross-loadings" option), will be high; and cross-loadings will be low" (Kock, 2010).

The CITC values for the ES strategy types are above 0.3, indicating good internal consistency (De Vaus, 2002) (between 0.538 and 0.727 for defensiveness; between 0.576 and 0.728 for analysis; between 0.361 and 0.479 for aggressiveness; between 0.494 and 0.658 for risk aversion; and between 0.490 and 0.660 for futurity). Cronbach's Alpha If Item Deleted

values are higher than Cronbach's Alpha Values indicating each item is useful and contributes to the factor. There is one exception to this case: The Cronbach's Alpha if Item Deleted value for the variable RISKAV1 is less than the Cronbach's Alpha value for the same items. This means removing the variable RISKAV1 from the factor would improve the reliability of the construct. However, literature and our other analyses indicate we are better off using this variable in the construct. In addition, removal of this variable will not be adding much to our analysis since the difference in Cronbach's alpha in both cases (in two columns) are very close. Therefore, we are including RISKAV1 variable within our construct (see Table 30).

Table 30 Corrected Item-Total Correlations and Reliabilities for ERP Strategy Types

Construct - ES Strategy	Variables	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Defensiveness	DEFF1	0.544	0.830	0.838
	DEFF2	0.699	0.788	
	DEFF3	0.708	0.787	
	DEFF4	0.727	0.780	
	DEFF5	0.538	0.835	
Analysis	ANLY1	0.668	0.823	0.854
	ANLY2	0.576	0.845	
	ANLY3	0.709	0.812	
	ANLY4	0.728	0.807	
	ANLY5	0.653	0.827	
Aggressiveness	AGGRS1	0.367	0.542	0.592
	AGGRS2	0.361	0.548	
	AGGRS3	0.479	0.370	
Risk Aversion	RSKAV1	0.494	0.757	0.750
	RSKAV2	0.597	0.643	
	RSKAV3	0.658	0.567	
Futurity	FUTUR1	0.549	0.671	0.739
	FUTUR2	0.490	0.739	
	FUTUR3	0.660	0.535	

Notes:

Method: Oblique Rotation
DEFF: Defensiveness
ANLY: Analysis
AGGRS: Aggressiveness
RSKAV: Risk Aversion
FUTUR: Futurity

Following the factor analysis for business strategy types (Table 25 – 27) and ERP strategy types (Table 29, 30), EFA and CFA for the performance measurement have been conducted. Through EFA, based on Eigen values, our results indicate three factors for

performance: Absolute Financial Performance, Relative Financial Performance, and Product-Service Innovation. All the items for each factor are loading properly on the expected factors and their loadings are above the threshold value of 0.5. The reliability of the measurement is acceptable in terms of Cronbach's alpha (0.887 for absolute financial performance; 0.862 for relative financial performance; and 0.697 for product-service innovation) and composite reliability (0.912 for absolute financial performance; 0.907 for relative financial performance; and 0.832 for product-service innovation) since they are greater than 0.7 or 0.6 (for marginally acceptable) (Fornell & Larcker, 1981; Nunnaly, 1978). Kaiser-Meyer-Olkin (KMO) measure of sample adequacy is 0.818 and Bartlett's test of sphericity (Chi Square) is 944.295 with the significance level of 0.01. Total variance explained is 68.320 for the model (see Table 31).

Table 31 Exploratory Factor Analysis and Reliability Values for Performance Measurement

Performance	Variables	Factor1	Factor2	Factor3	Cronbach's Alpha	CR
Absolute Financial Performance	AFP1	***0.792***	-0.028	0.034	***0.887***	***0.912***
	AFP2	***0.660***	0.170	-0.078		
	AFP3	***0.669***	0.151	0.182		
	AFP4	***0.658***	0.172	-0.172		
	AFP5	***0.608***	0.262	-0.090		
	AFP6	***0.873***	0.219	0.187		
Relative Financial Performance	RFP1	-0.072	***0.797***	0.126	***0.862***	***0.907***
	RFP2	0.107	***0.833***	0.066		
	RFP3	0.232	***0.766***	0.104		
	RFP4	0.219	***0.822***	-0.029		
Product-Service Innovation	PSI1	-0.159	0.150	***0.714***	***0.697***	***0.832***
	PSI2	0.241	0.037	***0.649***		
	PSI3	0.118	0.041	***0.849***		

Notes:

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
AFP: Absolute Financial Performance
RFP: Relative Financial Performance
PSI: Product-Service Innovation

The CITC values for the performance measurements are above 0.3, indicating good internal consistency (De Vaus, 2002) (between 0.648 and 0.806 for absolute financial performance; between 0.655 and 0.859 for relative financial performance; and between 0.446 and 0.574 for product-service innovation). Cronbach's Alpha if Item Deleted values for each

indicator are higher than Cronbach's alpha values for that construct indicating each performance item is useful and contributes to the performance factors (see Table 32).

Table 32 Corrected Item-Total Correlations and Reliabilities for Performance Measurement

Construct - Performance	Variables	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Absolute Financial Performance	AFP1	0.735	0.863	0.886
	AFP2	0.686	0.868	
	AFP3	0.648	0.873	
	AFP4	0.693	0.868	
	AFP5	0.687	0.868	
	AFP6	0.806	0.853	
Relative Financial Performance	RFP1	0.680	0.835	0.860
	RFP2	0.809	0.777	
	RFP3	0.695	0.829	
	RFP4	0.655	0.843	
Product-Service Innovation	PSI1	0.511	0.592	0.690
	PSI2	0.446	0.675	
	PSI3	0.574	0.527	

Notes:

AFP: Absolute Financial Performance
RFP: Relative Financial Performance
PSI: Product-Service Innovation

The correlations among different types of performance measurements are positive and significant. This indicates each sub-category of performance is sufficient enough to form a construct by them. The correlation between absolute performance and relative performance is 0.319 (at 0.01 significance level), and product-service innovation is 0.209 (at 0.05 significance level); and relative performance and product-service innovation is 0.215 (at 0.05 significance level). The AVE values are 0.775 for absolute financial performance, 0.842 for relative financial performance, and 0.790 for product-service innovation indicating good discriminant validity (see Table 33).

Table 33 Bivariate Correlations and Square Roots of Average Variance Extracted (AVE) Values for Performance Measurements

Constructs	Perf1	Perf2	Perf4
Perf1	(0.775)		
Perf2	0.391**	(0.842)	
Perf3	0.209*	0.215*	(0.790)

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The final element in our model is the ERP flexibility. The items for ERP flexibility are loading as expected (based on literature) and the loading values are greater than 0.5 (Hair et al. 2006) indicating a good discriminant validity. Reliability of the measurement is acceptable since Cronbach's alpha (0.880) and composite reliability (0.907) values are above the threshold value of 0.7 (Hair et al. 2006; Nunnaly, 1978) (see Table 34).

Table 34 Factor Loadings and Reliability Values for Flexibility

Items	Loadings	Cronbach's Alpha	Composite Reliability
Flex1	0.771		
Flex2	0.689		
Flex3	0.720		
Flex4	0.774	***0.880***	***0.907***
Flex5	0.754		
Flex6	0.844		
Flex7	0.785		

CITC analyses reveal all correlations are above 0.3 (De Vaus, 2002) indicating there is good internal consistency among strategic ERP flexibility items. In addition, Table 35 shows each item is useful and contributes to the factor.

Table 35 Corrected Item-Total Correlations and Reliabilities for Strategic ERP Flexibility

Construct	Variables	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Strategic ERP Flexibility	Flex1	0.673	0.860	0.880
	Flex2	0.580	0.872	
	Flex3	0.618	0.867	
	Flex4	0.676	0.860	
	Flex5	0.651	0.864	
	Flex6	0.768	0.848	
	Flex7	0.688	0.858	

Table 36 and Table 37 show the descriptive statistics such as means and standard deviations for the variables from the questionnaire. Whilst the first column shows the constructs such as strategy types, i.e. business in §1 and ES in §2, and performance in §3 for Table 36, second column in Table 36 and the first column in Table 37 show the variables that comprise these constructs. The last two columns in both tables reveal the means and standard deviations for these variables.

Table 36 Descriptive Statistics for ES and Business Strategy Types, and Performance

1st Order Construct	2nd Order Constructs	Mean	Std. Deviation	Variance
Business Strategy	*Defensiveness*	3.8409	0.7987	0.638
	Analysis	3.5591	0.8457	0.715
	Aggressiveness	2.7778	0.9146	0.837
	Risk Aversion	3.2652	0.8619	0.743
	Futurity	3.3262	1.0426	1.087
Enterprise Systems Strategy	*Defensiveness*	3.2957	0.7920	0.627
	Analysis	3.4565	0.8245	0.680
	Aggressiveness	3.0507	0.8487	0.720
	Risk Aversion	3.2464	0.8237	0.679
	Futurity	3.1594	1.0145	1.029
Performance	*Performance1*	3.3840	0.7451	0.555
	Performance2	3.3424	0.8634	0.745
	Performance3	3.3007	0.7331	0.537

Notes:

Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

Table 37 Descriptive Statistics for Flexibility and Strategic Support Types Measurements

Constructs	Mean	Std. Deviation	Variance
StrategicERP Flexibility	2.8556	0.8066	0.651
Operational	3.5036	0.8006	0.641
Managerial	2.8870	0.8901	0.792
Market Information	3.1793	0.8391	0.704
Strategic DS	3.1594	1.0145	1.029

After identifying the constructs and descriptive statistics, the next step in data analysis is calculation of alignment score. The alignment between ERP and business strategy has been calculated based on Venkatraman's (1989) study. As mentioned earlier, Venkatraman (1989) identifies six types of alignment (the authors used the term fit) such as Fit as Moderation (Interaction), Fit as Mediation, Fit as Matching, Fit as Gestalt, Fit as Profile Deviation, and

finally Fit as Covariation. Considering the objective of the study, type of data collected, and previous studies using these analyses, we can conduct three of these fit analyses: Fit as Moderation, Fit as Matching, and Fit as Profile Deviation. Following the suggestions in literature, Fit as Moderation has been selected as the appropriate type of measurement for this study (refer to Venkatraman (1989) study for detailed information regarding different types of measurements). Several researchers (Cragg et al. 2002; Guest, 1997; Chan, 1992) argue Fit as Moderation is a superior method for measurement and has more advantages over Fit as Matching that is also an appropriate measurement of fit for our data. In addition, Venkatraman (1989) states that Fit as Profile deviation can be used in order to complement the analysis when researchers use either fit as matching or fit as moderation. Therefore, although our main method for alignment is Fit as Moderation, we have followed Venkatraman's suggestion and have used Fit as Profile Deviation approach in addition to Fit as Moderation approach in our analysis. Fit as Matching analysis are available at the Appendices section for further reading and comparison.

Moderation or interaction approach examines the relationship between business strategy attributes and performance while the ERP attributes moderates this relationship. Based on the definition by Venkatraman (1989) and Chan et al. (1997), an illustration of moderation would be as follows (see Table 38):

Table 38 Illustration of Fit as Moderation

Organizations	Business Strategy Attributes (BS)	ES Strategy Attributes (ES)	Σ(BS*ES)
Org1	1, 2, 3, 1, 2	2, 3, 5, 1, 1	Sum=26, Ave=5.2
Org2	2, 4, 5, 3, 5	3, 3, 4, 2, 3	Sum=59, Ave=11.8

The perfect alignment would be 25 while the misalignment would be 1 based on the definition of moderation effect. In our example, organization #2 would have greater moderation effect than organization #1. In moderation, the greater number represents the greater impact. Therefore, the greater the impact of ES attributes, the more impact business attributes have on performance.

These analyses have different meanings based on the approach they are used on. As mentioned earlier, Drazin and Van de Ven (1985) identify three approaches, systems, bivariate, and selection, where the relationships among constructs can be examined. Considering the nature

and requirements of these approaches, only bivariate and systems approaches are appropriate for this study. Literature suggests both bivariate and systems approaches have different contributions to the research. Therefore, in our analysis, in order to have a broader understanding of the alignment of ERP, we conducted our analysis with both approaches for both fit as moderation and fit as profile deviation.

4.1.1 Systems Approach

4.1.1.1 Alignment as Moderation

After conducting factor analysis and checking correlations, we have performed PLS analysis in order to test our hypotheses. Our first model tests the relationship between strategic alignment that is calculated through alignment as moderation approach, and performance under systems approach. The theoretical model, its path coefficients and significance levels are shown in Figure 29. In this figure, β represents the path coefficient, and (*) represent the significance levels. Considering the main objective of the PLS analysis is to minimize the error in endogenous variables (Hulland, 1999), the success of this objective can be examined through the path coefficients and the total variance explained values, which represent the variance explained by the model. Therefore, we are reporting both path coefficients and R squared values of endogenous constructs. The results from WarpPLS analysis reveal the relationship between strategic alignment and performance is positive and significant (β=0.30 at 0.01 significance level). Total variance explained (R^2) is found as 0.09. In addition to aforementioned analysis, we have calculated the fit for the theoretical model shown in Figure 29. Kock (2010) suggests using a set of measures such as average R-Squared (ARS), average variance inflation factor (AVIF) and average path coefficient (APC) values to examine the quality of the model. Our results show that ARS value is 0.089, APC value is 0.298 and both of these measurements are significant at the 0.01 level. In addition, AVIF value is 1.00, which is less than five; therefore indicating a good fit of the model. In other words, calculations of model fit reveal goodness-of-fit for the model is acceptable.

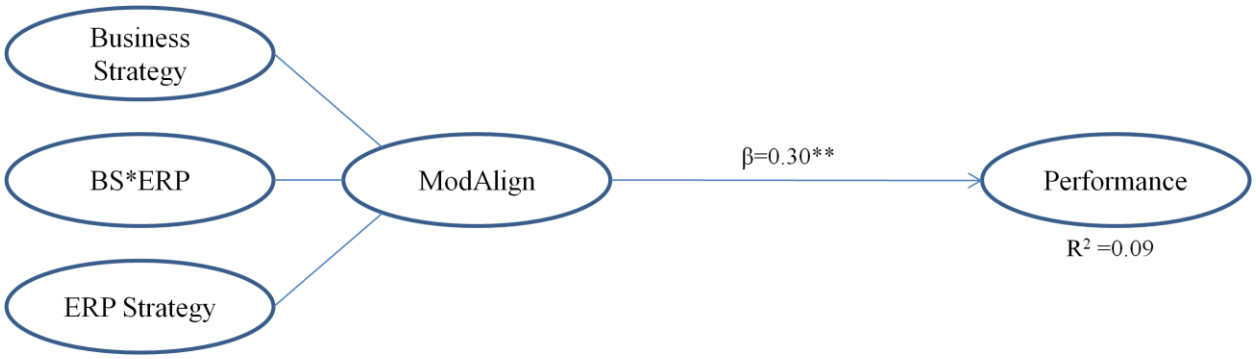

Figure 29 Path Coefficients in Structural Equation Model for Alignment (Moderation) and Performance

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
β: Path Coefficient
*BS*ERP: Interaction between Business Strategy and ERP Strategy*
ModAlign: Alignment as Moderation
Performance: Business Performance

Figure 30 presents the path coefficients between flexibility and performance since this individual test can help identifying the nature of relationship among all three constructs. As the Figure 30 shows, the relationship between flexibility and performance is positive (β=0.24) and significant at 0.01 level. In addition, the fit analysis also reveal the goodness-of-fit for the model is acceptable (APC is 0.243 ($p<0.01$); ARS is 0.059 ($p<0.1$); and AVIF is 1.000 (less than the threshold value of 5)) indicating no risk of multicollinearity.

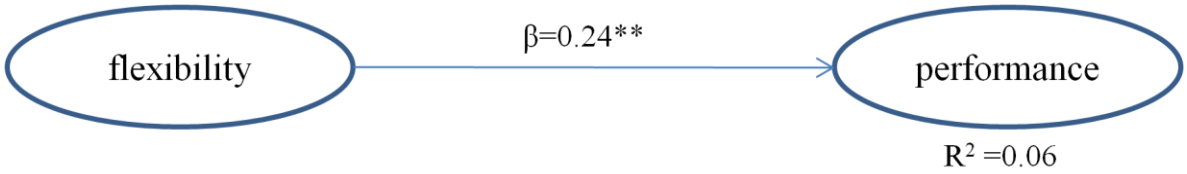

Figure 30 Path Coefficients in Structural Equation Model for Flexibility and Performance with Systems Approach

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
β: Path Coefficient
flexibility: Strategic ERP Flexibility
performance: Business Performance

Furthermore, we have combined these two models and examined the relationship between alignment, performance, and flexibility. Therefore, we test the model with alignment as mediator between flexibility and performance. As shown in Figure 31, the relationship between alignment and flexibility (β=0.78), and alignment and performance (β=0.26) are significant at 0.01 level and 0.05 level, respectively. However, the results reveal the relationship between flexibility and performance is not significant (which might indicate a mediation effect). For this model, the recorded APC value is 0.365; ARS is 0.353 and significant at 0.01 level while the AVIF value is 2.254 stating a good fit of the model without any risk of multicollinearity.

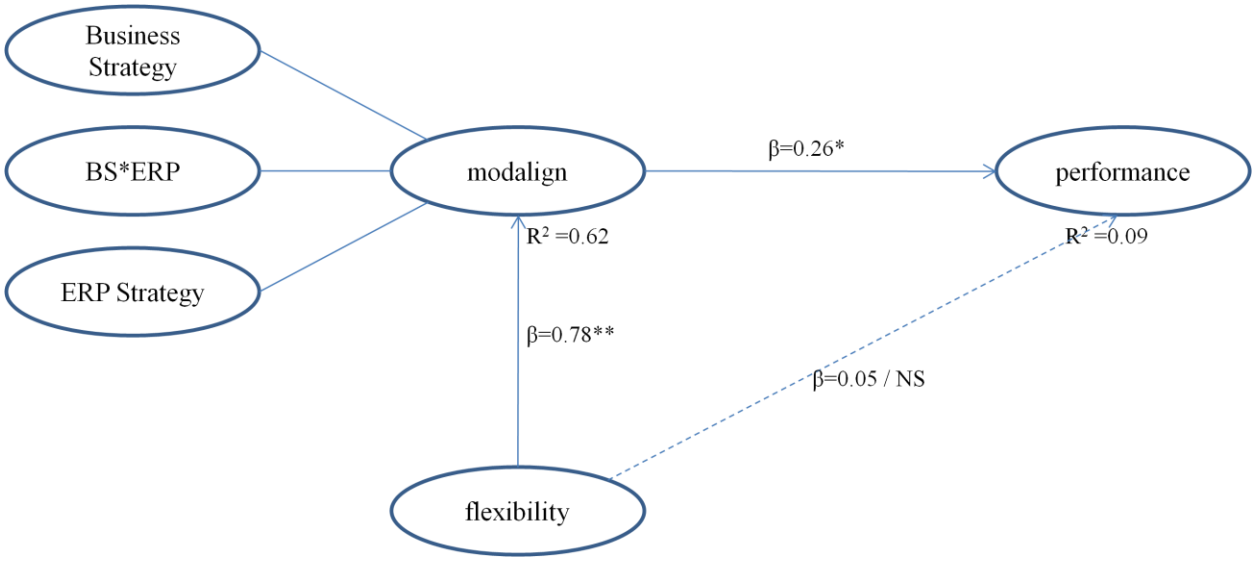

Figure 31 Path Coefficients in Structural Equation Model for Alignment as Mediator

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
*BS*ERP: Interaction between Business Strategy and ERP Strategy*
ModAlign: Alignment as Moderation
Performance: Business Performance
Flexibility: Staretgic ERP Flexibility

The mediation effect has been initially tested through Sobel test (Baron & Kenny, 1986). We have followed the four steps, that being the four consequent regression analysis to test the mediation effect described by Baron and Kenny (1986): a) regression between independent variable and dependent variable; b) regression between independent variable and mediator; c)

regression between mediator and dependent variable while controlling for the independent variable; and finally d) regression between independent variable and dependent variable while controlling the mediating variable. The results of these analyses must satisfy these conditions and show the dependent variables should be significantly affected by their associated dependent variables in cases a, b, and, c above. The next requirement for an appropriate mediation effect is the results of the regression between independent variable and dependent variable while controlling the mediating variable should be nonsignificant. Most importantly, the mediation effect (calculated through Sobel Test Equation) has to be significant for the analysis.

Aroian Test and Goodman Test are two other common techniques for identifying the mediation effect. The formulas for calculating Sobel Test, Aroian Test, and Goodman Test are as follows (Baron & Kenny, 1986; Sobel, 1982; Goodman, 1960; MacKinnon, Warsi, & Dwyer, 1995; Aroian, 1944/1947):

Sobel Test Equation or Sobel's First-Order Approximation:

$$z - value = \frac{a * b}{\sqrt{b^2 * s_a^2 + a^2 * s_b^2}} \tag{6}$$

Aroian Test Equation or Aroian's Second-Order Exact Solution:

$$z - value = \frac{a * b}{\sqrt{b^2 * s_a^2 + a^2 * s_b^2 + s_a^2 * s_b^2}} \tag{7}$$

Goodman Test Equation or Goodman's Unbiased Solution:

$$z - value = \frac{a * b}{\sqrt{b^2 * s_a^2 + a^2 * s_b^2 - s_a^2 * s_b^2}} \tag{8}$$

, where:

a = raw (unstandardized) regression coefficient for the association between IV and mediator.
s_a = standard error of a.
b = raw coefficient for the association between the mediator and the DV (when the IV is also a predictor of the DV).
s_b = standard error of b.

First steps of Sobel Test reveal the relationship between dependent-independent, independent-mediator, mediator-dependent (while controlling the independent) variables are significant, while the relationship between independent-dependent (while controlling mediator) is nonsignificant. Therefore, initial tests show there is a mediation effect of mediator between independent and dependent variable (see Table 39).

Table 39 Sobel Test of Mediation for Alignment as Moderation with Systems Approach

Relationship						
Independent	**Dependent**	**Control**	**Coefficient**	**S.E.**	**t value**	**Significance**
Flexibility	Performance	None	*0.1626*	*0.0714*	*2.2778*	*0.02*
Flexibility	Alignment	None	*4.0213*	*0.3352*	*11.99*	*0.00*
Alignment	Performance	Flexibility	*0.0435*	*0.0221*	*1.97*	*0.05*
Flexibility	Performance	Alignment	*-0.0121*	*0.1133*	*-0.1072*	*0.91*

More importantly, analysis of the Sobel Test as well as alternative measurements such as Aroian and Goodman Tests confirm alignment (in this case alignment as moderation) is mediator between ERP flexibility and performance. In other words, higher flexibility leads to higher performance when there is alignment (see Table 40).

Table 40 Alternative Measurements of Mediation Effect for Alignment as Moderation with Systems Approach

Independent Variable	**Dependent Variable**	**Input Variable**	**Input Value**	**Test Type**	**T Stat.**	**Std. Error**	**P Value**
Flexibility	Alignment (Moderation)	Coefficient	4.021	Sobel Test	2.911	0.058	0.003
		Std. Error	0.335				
Alignment (Moderation)	Performance	Coefficient	0.042	Aroian Test	2.901	0.058	0.004
		Std. Error	0.014	Goodman Test	2.920	0.058	0.003

After analyzing the relationship between alignment and performance, the ANOVA test was used to examine relationships between performance and flexibility. For this purpose, flexibility was converted into three levels: low, medium, and high for simplicity purposes. The ANOVA test has been used for testing the mean differences in performance for the three groups of flexibility.

The F values shown in Table 41 are significant for each business strategy types. This shows the means for each business strategy types are significantly different from each other. However, as Table 42 shows, there is no significant difference between absolute financial performance and relative financial performance in terms of the flexibility level. Therefore, we cannot reject that means for absolute and relative performance are same. Product-service is, on the other hand, is statistically significant.

Table 41 ANOVA Results for Business Strategy Types Based on Level of Flexibility

Alignment Type	Individual Alignment	Mean	Standard Deviation	Mean Squares W	F Value	Sig.
Moderation	Defensiveness	20.094	5.457	18.465	28.869	.000
	Analysis	19.722	5.936	21.478	30.148	.000
	Aggressiveness	14.208	4.939	19.016	13.862	.000
	Risk Aversion	17.277	4.970	21.326	8.196	.001
	Futurity	17.726	7.438	40.359	17.869	.000

Table 42 ANOVA Results for Performance Based on Level of Flexibility

Performance	Mean	Standard Deviation	Mean Squares	F Value	Sig.
Performance 1	3.384	0.745	0.554	1.151	0.321
Performance 2	3.342	0.863	0.737	1.507	0.227
Performance 3	3.301	0.733	0.509	3.575	0.032

Notes:

Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

Further ANOVA results reveal three levels of flexibility, as low, medium, and high, are statistically significant for alignment as moderation. In other words, the means of each alignment categorization based on the level of alignment are different (see Table 43). In addition, as the level of flexibility increases, the mean difference for alignment increases (see Table 44). Therefore, we can argue as the level of flexibility increases, the alignment increases as well.

Table 43 Results for Alignment as Moderation Based on Flexibility Level

Construct	Level of Flexibility	Mean	Standard Deviation	Mean Squares	F Value	Sig.
Alignment as Moderation	Low	11.343	2.614	8.237	49.949	0.000
	Medium	17.136	2.844			
	High	21.560	3.005			

Table 44 Post Hoc Tests for Alignment as Moderation Based on Flexibility Level

Construct	Levels of Flexibility		
Alignment as Moderation		Medium	High
	Low	-5.792**	-10.217**
	Medium	-	-4.424**

Based on the results, the statuses of some of our hypotheses are presented in Table 45.

Table 45 Summary of Hypotheses and Their Status

Hypotheses	Status
Hypothesis 1: There is a positive relationship between alignment and business performance.	Supported
Hypothesis 2: There is a positive relationship between flexibility and business performance through alignment.	Supported
Hypothesis 3: The level of ERP flexibility is positively associated with alignment.	Supported

4.1.1.2 Calculation of Alignment as Profile Deviation

In addition to previous analysis, by following Venkatraman (1989) suggestions, we have measured alignment as profile deviation that complements the analysis of alignment as moderation. Analysis in this sub-section will explain the steps for calculating alignment as profile deviation required for conduct the alignment as profile deviation analysis.

In order to test the hypotheses of this study, we need to identify the factors that will be used in the model in which alignment is measured as profile deviation. Therefore, based on the literature, we have identified the potential factors. Initially, Exploratory Factor Analysis (EFA) has been conducted and then our structure of the factor has been confirmed through the Confirmatory Factor Analysis (CFA). EFA results indicate all items are loading to the expected factors (operational, managerial, market information, and strategic decision support) and their values are greater than the threshold value of 0.5 (Hair et al. 2006) indicating a good discriminant validity. Cronbach's alpha is over 0.7; therefore indicating acceptable reliability of

measurement (Fornell & Larcker, 1981; Nunnaly, 1978). In addition, Kaiser-Meyer-Olkin (KMO) measure of sample adequacy is 0.895 and Bartlett's test of sphericity (Chi Square) is 1090.895 with the significance level of 0.01 indicating that factor analysis can be conducted. Total variance explained is found as 66.429 for the model. Meanwhile, although literature provides information regarding the fifth attribute as "Organizational," our results did not reveal such a factor. Further examination of our data has informed us of the existence of the "Organizational Attribute." However, the cross-loadings of the items lead us not to proceed with that set of analysis (see Table 46).

Table 46 Exploratory Factor Analysis and Reliability Values for ES Strategic Support Types

Constructs	Variables	Factor1	Factor2	Factor3	Factor4	Cronbach's Alpha
Operational	OPER1	***0.584***	0.270	0.271	0.397	0.884
	OPER2	***0.738***	0.123	0.265	0.038	
	OPER3	***0.788***	0.139	0.198	-0.055	
	OPER4	***0.695***	0.252	0.242	0.180	
	OPER5	***0.750***	0.394	0.155	0.158	
	OPER6	***0.665***	0.305	0.028	0.333	
Managerial	MNGR1	0.221	***0.675***	0.189	0.124	0.869
	MNGR2	0.318	***0.674***	0.212	0.122	
	MNGR3	0.288	***0.760***	0.222	0.130	
	MNGR4	0.218	***0.600***	0.469	0.272	
	MNGR5	0.215	***0.759***	0.115	0.223	
Market Information	MARIN1	0.258	0.485	***0.660***	0.097	0.864
	MARIN2	0.253	0.532	***0.592***	0.139	
	MARIN3	0.065	0.304	***0.639***	0.059	
	MARIN4	0.452	0.310	***0.531***	0.162	
	MARIN5	0.357	0.192	***0.679***	0.093	
	MARIN6	0.200	-0.059	***0.740***	0.326	
Strategic Decision Support	STRDS1	0.264	-0.012	0.179	***0.786***	0.739
	STRDS2	-0.068	0.403	0.249	***0.617***	
	STRDS3	0.143	0.357	0.089	***0.770***	

Notes:

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
OPER: Operational
MNGR: Managerial
MARIN: Market Information
STRDS: Strategic Decision Support

In the ES literature loadings of 0.5 and above for factor analysis are acceptable (Hair et al. 2006). Our results indicate all variables are loading at 0.5 or above. However, in a few cases, loading of some variables are higher than the rest of the variables. These variables such as

MARIN2 may be cross loading to more than one variable. In this case, small sample size can be explained as the main reason for the cross loading for these parameters (Shevlin & Miles, 1998). In order to verify and clarify the results of exploratory factor analyses (Doll, Xia, & Torkzadeh, 1994), as well as for confirming our structure of the model, we have conducted Confirmatory Factor Analysis (CFA) as well.

Doll et al. (1994) state CFA "provides a more rigorous and systematic test of alternative factor structures than is possible within the framework of exploratory factor analysis" (p. 454, (Bollen, 1989; Joreskog & Sorbom, 1989). It provides information regarding reliability of the instrument and its components (Doll et al. 1994) as well as the goodness-of-fit.

Therefore, following the EFA, we have conducted CFA to confirm our structure of the model. The results show CFA confirms the findings of EFA. All item loadings are above the threshold value of 0.5 (Hair et al. 2006) and reliability measurements are also acceptable. Cronbach's alpha for operational is 0.884, for managerial is 0.869, for market information is 0.864, and for strategic decision support is 0.739. In addition, composite reliability values for operational is 0.912, for managerial is 0.905, for market information is 0.899, and for strategic decision support is 0.852. Since both measurements pass the threshold values of 0.7 (or 0.6 for marginally acceptable), the measurement is reliable (Fornell & Larcker, 1981; Nunnaly, 1978) (see Table 47). As seen in Table 47, the cross-loading problem does not appear. Therefore, validity has been confirmed and no cross-loading problem exists with the factors.

Table 47 Confirmatory Factor Analysis and Reliabilities for ES Strategic Support Types

Constructs	Variables	Factor1	Factor2	Factor3	Factor4	Cronbach's Alpha	CR
Operational	OPER1	***0.613***	-0.040	0.094	0.257	0.884	0.912
	OPER2	***0.838***	-0.146	0.141	-0.145		
	OPER3	***0.939***	-0.149	0.066	-0.216		
	OPER4	***0.780***	-0.050	0.062	0.040		
	OPER5	***0.826***	0.192	-0.080	-0.062		
	OPER6	***0.788***	0.168	-0.272	0.125		
Managerial	MNGR1	0.014	***0.799***	-0.061	-0.030	0.869	0.905
	MNGR2	0.066	***0.852***	-0.056	-0.079		
	MNGR3	0.070	***0.845***	-0.036	-0.040		
	MNGR4	-0.128	***0.607***	0.336	0.097		
	MNGR5	-0.018	***0.958***	-0.198	0.046		
Market Information	MARIN1	-0.107	0.252	***0.776***	-0.059	0.864	0.899
	MARIN2	-0.075	0.314	***0.646***	-0.002		
	MARIN3	-0.224	0.083	***0.778***	-0.037		
	MARIN4	0.245	-0.006	***0.606***	0.002		
	MARIN5	0.140	-0.189	***0.891***	-0.104		
	MARIN6	-0.002	-0.544	***0.999***	0.227		
Strategic Decision Support	STRDS1	0.234	-0.392	0.058	***0.889***	0.739	0.852
	STRDS2	-0.262	0.196	0.132	***0.696***		
	STRDS3	0.010	0.192	-0.167	***0.844***		

Notes:

Method: Oblique Rotation
OPER: Operational
MNGR: Managerial
MARIN: Market Information
STRDS: Strategic Decision Support

The CITC analyses reveal all items are highly correlated. Therefore there is a high internal consistency among the variables. The next column in Table 48 named as "Cronbach's Alpha if Item Deleted" shows each item individually contributes to its factor (De Vaus, 2002) since their values are equal or less than Cronbach's alpha.

Table 48 Corrected Item-Total Correlations and Reliabilities for ES Strategic Support Types

Construct - ES Strategy	Variables	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Operational	OPER1	0.683	0.865	0.883
	OPER2	0.651	0.871	
	OPER3	0.663	0.868	
	OPER4	0.710	0.861	
	OPER5	0.797	0.845	
	OPER6	0.674	0.868	
Managerial	MNGR1	0.611	0.860	0.866
	MNGR2	0.694	0.837	
	MNGR3	0.723	0.829	
	MNGR4	0.733	0.828	
	MNGR5	0.696	0.836	
Market Information	MARIN1	0.777	0.818	0.864
	MARIN2	0.728	0.829	
	MARIN3	0.530	0.863	
	MARIN4	0.668	0.840	
	MARIN5	0.682	0.838	
	MARIN6	0.573	0.856	
Strategic Decision Support	STRDS1	0.549	0.671	0.739
	STRDS2	0.490	0.739	
	STRDS3	0.660	0.535	

Notes:

OPER: Operational
MNGR: Managerial
MARIN: Market Information
STRDS: Strategic Decision Support

Bivariate correlations among the strategic support types are positive and significant. Operational is positively and significantly correlated with managerial (0.654 at 0.01 significance level), market information (0.665 at 0.01 significance level), and strategic decision support (0.467 at 0.01 significance level); managerial is positively and significantly correlated with market information (0.719 at 0.01 significance level), and strategic decision support (0.548 at 0.01 significance level); and finally market information is positively and significantly correlated with strategic decision support (0.508 at 0.01 significance level). The squared roots of AVE values, shown in parentheses in diagonals, for each construct are higher than the correlations between the item and other items (in other words square rooted AVE values are greater than the correlation below and left of it) (Fornell & Larcker, 1981) indicating good discriminant validity (see Table 49).

Table 49 Bivariate Correlations among the ES Strategic Support Types

	Operational	**Managerial**	**Market Information**	**Strategic DS**
Operational	(0.796)			
Managerial	0.654**	(0.810)		
Market Information	0.665**	0.719**	(0.774)	
Strategic DS	0.467**	0.548**	0.508**	(0.812)

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Although there are disagreements regarding the contribution of fit indices, the majority of the current studies (i.e., Su and Yang 2010) in ES literature have tendency to report the fit indices. For example, Hulland (1999) states that several fit indices produced by Partial Least Squares (PLS) (i.e., Bentler–Bonett normed fit index by Bentler and Bonett 1980) have no use because of the conflict between the logic of algorithms of goodness-of-fit indices (i.e., "based on the assumption that the estimated model parameters are chosen in an attempt to minimize the difference between the observed and the reproduced covariance matrices" Hulland 1999, p. 202) and the assumptions in PLS analysis. However, in order to confirm the robustness of our analysis, additional fit measurements with AMOS have been conducted. Although WarpPLS provides fit indices, which indicate good fit for our models, additional fit measures that are conducted with AMOS will be provided for two reasons: First reason is to confirm this study's results; and second reason is a great amount of researchers are more familiar with the results of AMOS.

Although there is no agreed value for Goodness-of-Fit (GFI), 0.9 or in some cases 0.8 as threshold for the GFI value have been accepted as a measure of good fit. GFI value can be affected by several factors. Among them, factor loadings and sample size are two of common reasons (Shevlin & Miles, 1998; Bollen, 1989; Gerbing & Anderson, 1993). Normed Fit Index (NFI) above 0.9 is also recommended. Because of the sample size, this value is lower than the expected value. Therefore, considering the small sample size of our data set, in spite of the relatively low GFI and NFI values, our results have acceptable goodness of fit values (see Table 50).

Table 50 Goodness-of-Fit Indices for the General Constructs of the Study

Key Construct	X^2	d.f.	X^2 /d.f.	NFI	GFI	RMSE	PCLOSE	Hoelter
ES Strategy	193.796	142	1.36**	0.810	0.826	0.063	0.168	0.01
Business Strategy	151.476	142	1.07	0.724	0.857	0.027	0.872	0.01
Flexibility	25.348	14	1.81*	0.915	0.935	0.094	0.108	0.01
Strat.Supp.Types	248.377	164	1.51**	0.791	0.800	0.075	0.02	0.01

Notes:

X^2 – Chi Square
Df – Degrees of freedom
NFI – Normed fit index
RMSE – Root Mean Square Error
Hoelter – Hoelter Value
ARS – Average R^2
Strat.Supp.Types: Strategic Support Types

Although, usually the acceptable GFI is above 0.9, we would like to reiterate these measurements are very sensitive to sample size. Therefore GFI value close to 0.9 with a sample size of 92 would not indicate a bad fit, considering that other fit measurements, which are too sensitive to sample size, provide acceptable and good fit.

After identifying factors and testing for reliability and validity, alignment (profile deviation) has been measured through a set of analysis described by Venkatraman (1989). Based on Venkatraman's study, there are three main analytical issues for alignment as profile deviation: a) Ideal profile development. The approaches for ideal profile development include using a theoretical base or empirical approach; b) Identifying weights for the dimensions. Two alternatives for this approach are identifying equal weights or differentially weighting the dimensions. In a strategy context, Venkatraman (1989) does not recommend using equal weights. The authors suggests using beta coefficients from a regression analysis between performance and each dimension as one approach; c) Using Euclidian distance as "the predictive power of the measure of coalignment" (p.435).

Profile deviation requires an ideal profile for the calculation. In the alignment literature, researchers mention two distinct approaches for profile deviation calculations (Venkatraman 1989): forming the ideal profiles through a theory (Sabherwal & Chan, 2001) or empirical analysis (Bozarth & Berry, 1997). In general, researchers recommend using the theoretical approach over empirical approach. One critique about the empirical approach or method is the

way the ideal profiles are set. Bergeron et al. (2003) use the top and bottom performing companies and removes them from the data. However, we need to ask the question of "how did they determine the best performing company while the objective is to find that alignment improves performance?" Therefore, we have adapted the theory approach for building the ideal profile tables. In addition, in order to confirm our results, we have also conducted analysis with the empirical/analytical approach (in appendices, Appendix C).

Based on Venkatraman's study, first, organizations were categorized into business strategy profiles (Defender, Differentiator, Analyzer, Cost Leader, and Prospector). This categorization has been done based on the proximity of the organization to each business profiles. This requires the normalization of mapping between business strategy profiles and attributes (Table 19) as ideal profiles. We have also normalized survey results in order to analyze our results within (-1, 1) interval. During the normalization the transfer function of y=(x-3)/2 has been used for mapping the interval (1, 5) to (-1, 1). With normalized results, in order to calculate the deviation from ideal profiles, Euclidian distance between business strategy attributes and ideal profiles has been calculated with the following formula (Sabherwal & Chan, 2001):

$$Distance_i = \sqrt{\sum \left\{ \left(X_j - K_{j,i} \right)^2 \right\}}, \forall\, i \tag{9}$$

Where i denotes to the business strategy profiles (Defender, Differentiator, Analyzer, Cost Leader, and Prospector), X_j refers to "the normalized score for j^{th} business strategy attribute, $K_{j,i}$ refers to the ideal normalized score of the j^{th} business strategy attribute" (Sabherwal & Chan 2001, p. 21) for the i^{th} business strategy profile. The summation includes all five strategy attributes for Proactiveness, Innovativeness, Analysis, Aggressiveness, and Defensiveness. After this step, each company is categorized into one of the business strategy profiles based on the distance. The company is considered as one of the business profiles with the lowest distance (meaning that there is more resembling) to that business profile. In the second step, same calculations are done but this time based on the mapping between ERP profiles and attributes (Table 20). Another difference is the use of business strategy profile found in previous step. For example, one company is found to be a Defender type based on the proximity of its business

attributes to the all business strategy profiles. In this step, the Euclidian distance is calculated only for Defender for that company.

In other words, organizations can be categorized under one profile based on the distance among attributes. For example, each organization will have five different scores representing the distance between itself and other attributes (aggressiveness, analysis, defensiveness, futurity, proactiveness, riskiness and innovativeness) under the same business strategy profile (defenders, differentiations, analyzers, cost leaders, and prospectors). Therefore, an organization might have values like 1.8, 2.3, 2.5, 4.1, and 3.4 for defenders, differentiations, analyzers, cost leaders, and prospectors, respectively. Since the smallest number, 1.8 refers to defenders; the company is categorized as defender. In the third step, the Euclidian distance from the ideal profiles for ERP is calculated; however, this time only for one profile, which has been found to be the current business profile in the previous stage. For example, if a company is categorized under defender based on business strategy attributes, at this stage, the distance for only defender is calculated. Finally, the score, the misfit, is subtracted from 1 to obtain the alignment score. This result can be used to test the hypotheses. Figure 32 and the following formulas provide an illustration of measuring the alignment as profile deviation.

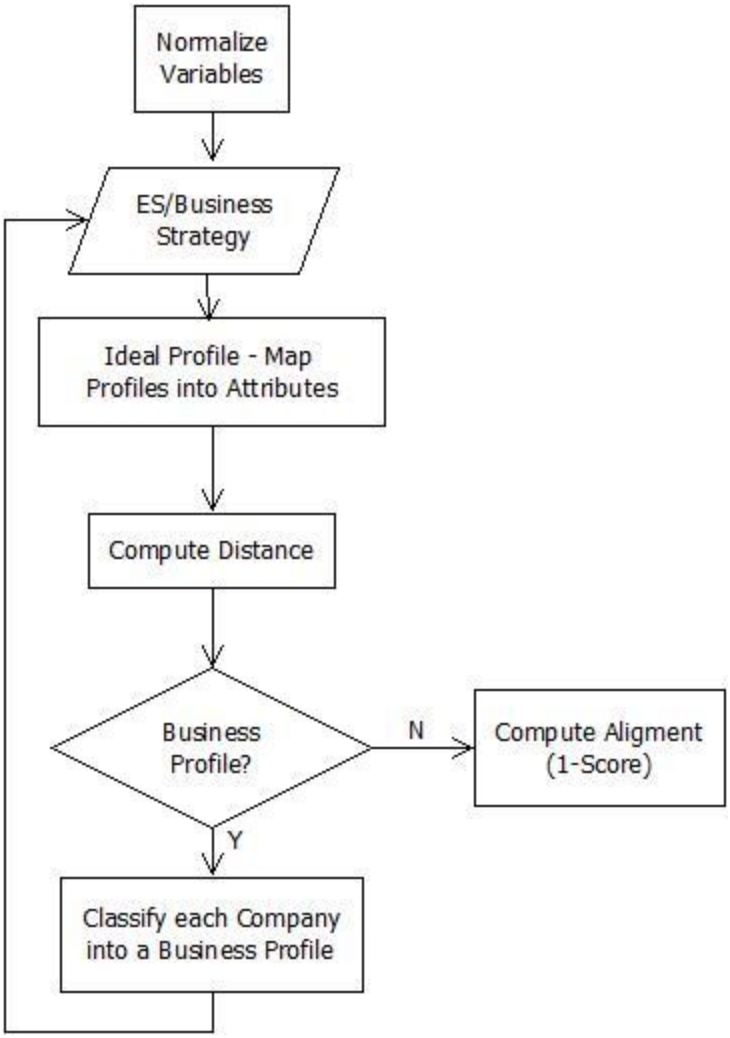

Figure 32 Abstract Level Representation of Analytical Approach to Profile Deviation

We can elaborate the calculation of alignment with some more detailed illustration of the formula (9).

$$Distance_{Prospectors} = \sqrt{((BSA_{Defensiveness} - BSP_{Prospectors})^2 + (BSA_{RiskAversion} - BSP_{Prospectors})^2 + (BSA_{Aggressiveness} - BSP_{Prospectors})^2 + (BSA_{Proactiveness} - BSP_{Prospectors})^2 + (BSA_{Analysis} - BSP_{Prospectors})^2 + (BSA_{Futurity} - BSP_{Prospectors})^2)}$$

$$Distance_{Differentiation} = \sqrt{((BSA_{Defensiveness} - BSP_{Differentiation})^2 + (BSA_{RiskAversion} - BSP_{Differentiation})^2 + (BSA_{Aggressiveness} - BSP_{Differentiation})^2 + (BSA_{Proactiveness} - BSP_{Differentiation})^2 + (BSA_{Analysis} - BSP_{Differentiation})^2 + (BSA_{Futurity} - BSP_{Differentiation})^2)}$$

$$Distance_{Analyzer} = \sqrt{((BSA_{Defensiveness} - BSP_{Analyzer})^2 + (BSA_{RiskAversion} - BSP_{Analyzer})^2 + (BSA_{Aggressiveness} - BSP_{Analyzer})^2 + (BSA_{Proactiveness} - BSP_{Analyzer})^2 + (BSA_{Analysis} - BSP_{Analyzer})^2 + (BSA_{Futurity} - BSP_{Analyzer})^2)}$$

$$Distance_{CostLeader} = \sqrt{((BSA_{Defensiveness} - BSP_{CostLeader})^2 + (BSA_{RiskAversion} - BSP_{CostLeader})^2 + (BSA_{Aggressiveness} - BSP_{CostLeader})^2 + (BSA_{Proactiveness} - BSP_{CostLeader})^2 + (BSA_{Analysis} - BSP_{CostLeader})^2 + (BSA_{Futurity} - BSP_{CostLeader})^2)}$$

$$Distance_{Defender} = \sqrt{((BSA_{Defensiveness} - BSP_{Defender})^2 + (BSA_{RiskAversion} - BSP_{Defender})^2 + (BSA_{Aggressiveness} - BSP_{Defender})^2 + (BSA_{Proactiveness} - BSP_{Defender})^2 + (BSA_{Analysis} - BSP_{Defender})^2 + (BSA_{Futurity} - BSP_{Defender})^2)},$$

where:

BSA: Normalized score for the business strategy attribute.

BSP: Normalized ideal score of the business strategy attribute for business strategy profile.

Next step would be: Organization's Business Strategy Type = Min ($Distance_{Prospectors}$, $Distance_{Differentiation}$, $Distance_{Analyzer}$, $Distance_{CostLeader}$, $Distance_{Defender}$).

After categorizing the organization as one of the business strategy types, we need to follow the steps for calculating the distance for ERP types but this time only for one strategy type, which is the organizations' business strategy type found in the previous step. After this step, each organization has a misfit score based on their ERP strategy. Subtracting this score from 1 will give us the alignment sore.

$$Distance_{MinBusStrProfile} = \sqrt{((ESA_{Operational} - ESP_{MinBusStrProfile})^2 + (ESA_{MarketInfo} - ESP_{MinBusStrProfile})^2 + (ESA_{Organizational} - ESP_{MinBusStrProfile})^2 + (ESA_{StrategicDS} - ESP_{MinBusStrProfile})^2 + (ESA_{Managerial} - BSP_{MinBusStrProfile})^2}$$

Alignment = 1 - $Distance_{MinBusStrProfile}$

where:

ESA: Normalized score for the ERP attribute.
ESP: Normalized ideal score of the ERP attribute for ERP profile.

4.1.1.3 Alignment as Profile Deviation

After conducting Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) and assessing the alignment values for profile deviation, the model has been tested with new alignment values trough Partial Least Square (PLS) analysis. The PLS analysis has been used for testing two models: i) between alignment and performance; and ii) among alignment, performance, and flexibility. In the first set of analysis, the results indicate a positive (β=0.34) and significant (at 0.01 level) relationship between alignment and performance. While the model fit is acceptable (Average R Square (ARS) value as 0.118 and significant at 0.05 level; Average Path Coefficient (APC) value is 0.343 and significant at 0.01 level), the multicollinearity risk is ignorable (AVIF is 1, so it is less than 5). The total variance explained for the model is reported as 0.12 (see Figure 33).

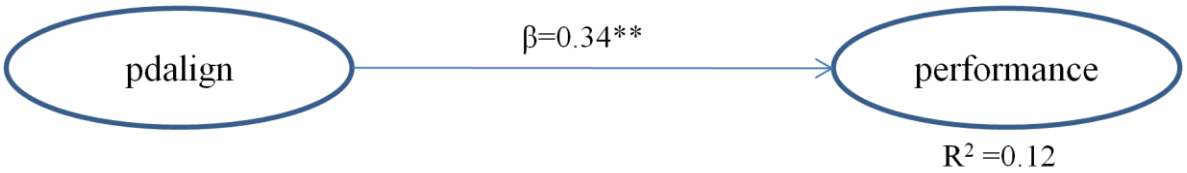

Figure 33 Path Coefficients in Structural Equation Model for Alignment as Profile Deviation

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
β: Path Coefficient
pdalign: Alignment as Profile Deviation
performance: Business Performance

In the latter analysis of SEM, strategic ERP flexibility construct has been included in the model. The model has been redesigned to test the relationship among flexibility, alignment, and performance. The results indicate a positive (β=0.30) and significant (at 0.05 level) relationship between alignment and performance and alignment and flexibility (β=0.73, p<0.01). On the other hand, our results did not show any direct and significant relationship between flexibility and performance (might be indicating a mediation effect). While the model fit is acceptable (Average Path Coefficients (APC) value as 0.376 and significant at 0.01 level; ARS value is 0.324 and significant at 0.01 level), the multicollinearity risk is ignorable (AVIF is 1.135, so it is less than 5). R^2 for alignment and performance are recorded as 0.12 and 0.53 for performance and alignment respectively (see Figure 34).

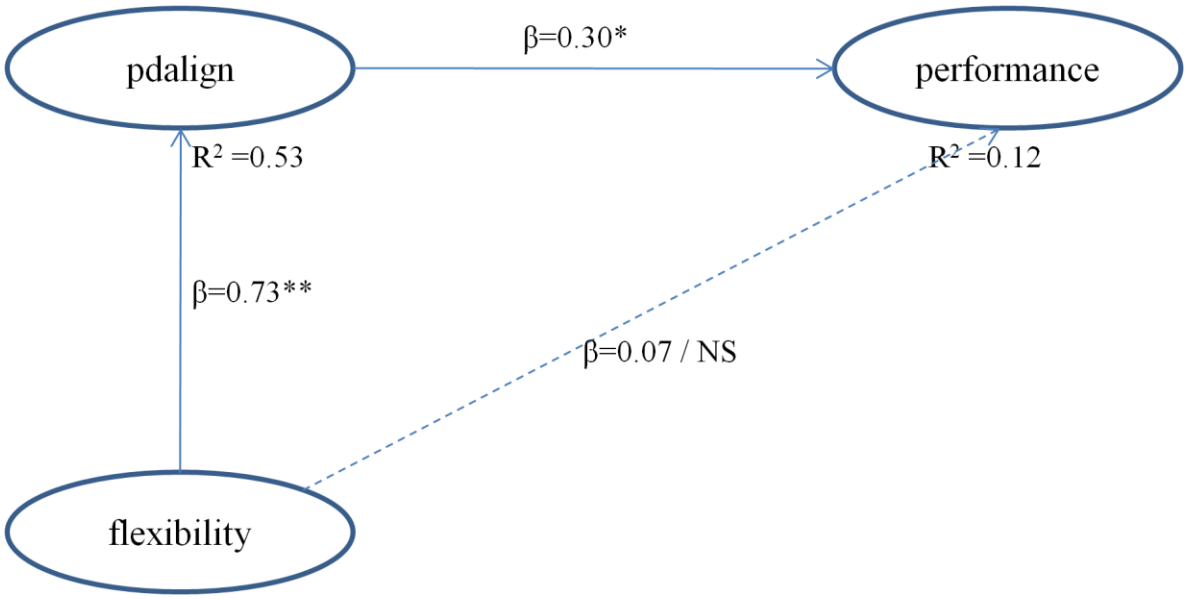

Figure 34 Path Coefficients in SEM for Alignment with Profile Deviation – Alternative Model

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
pdalign: Alignment as Profile Deviation
flexibility: Strategic ERP Flexibility
performance: Business Performance

Two methods can be used to assess our hypothesis: through regression analysis between alignment and other constructs, in our case flexibility and performance; or the correlation between alignment and other constructs that are flexibility and performance. Sabherwal & Chan (2001) suggest using correlation analysis rather than regression analysis because regression analysis may sacrifice some information. However, we have conducted both type of analysis to compare the results of these two analyses.

Positive and significant ($\beta=0.231$, $p<0.05$) correlation between alignment and performance support our hypothesis stating alignment between ERP and business strategy is positively associated with the performance. In addition, alignment has another positive and significant ($\beta=0.709$, $p<0.01$) relationship with flexibility. Also, our results indicate another significant correlation between flexibility and performance ($\beta=0.233$, $p<0.05$) (see Table 51).

Table 51 Correlations among Alignment, Performance, and Flexibility

	Alignment	**Performance**	**Flexibility**
Alignment	1		
Performance	0.231*	1	
Flexibility	0.709**	0.233*	1

Notes:

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

In order to examine the mediation effect of alignment between flexibility and performance, we have conducted the Sobel test with alignment measurement of profile deviation as well (see Table 52). The results indicate there is a mediation effect of alignment. In other words, alignment mediates the flexibility – performance relationship.

As mentioned earlier, we have followed the four steps for testing mediation effect: Checking whether the relationship between dependent-independent, independent-mediator, mediator-dependent (while controlling the independent) variables are significant, while the relationship between independent-dependent (while controlling mediator) is nonsignificant. Initial tests reveal there may be a mediation effect of mediator between independent and dependent variable (see Table 52); however, we need to be cautious regarding the regression results between mediating variable and dependent variable, while controlling independent variable.

Table 52 Sobel Test of Mediation for Alignment as Profile Deviation with Systems Approach

Relationship			**Measurements**			
Independent	**Dependent**	**Control**	**Coefficient**	**S.E.**	**t value**	**Significance**
Flexibility	Performance	None	*0.1626*	*0.0714*	*2.2778*	*0.02*
Flexibility	Alignment	None	*0.4421*	*0.0643*	*9.5513*	*0.00*
Alignment	Performance	Flexibility	*0.1463*	*0.1628*	*0.8986*	*0.37*
Flexibility	Performance	Alignment	*0.0980*	*0.1014*	*0.9659*	*0.33*

Further analysis of the Sobel test and alternative tests reveal alignment is a mediator between flexibility and performance, even when the alignment has been measured as profile deviation (see Table 53). This analysis eliminates the concerns regarding previous regression

analysis and confirms the mediation effect of alignment between strategic ERP flexibility and business performance.

Table 53 Alternative Measurements of Mediation Effect for Alignment as Profile Deviation with Systems Approach

Independent Variable	Dependent Variable	Input Variable	Input Value	Test Type	T Stat.	Std. Error	P Value
Flexibility	Alignment (Profile Deviation)	Coefficient	0.442	Sobel Test	2.1845	0.0522	0.029
		Std. Error	0.046				
				Aroian Test	2.1736	0.0525	0.029
Alignment	Performance	Coefficient	0.258				
		Std. Error	0.115	Goodman Test	2.1960	0.0519	0.028

4.1.2 Bivariate Approach

4.1.2.1 Alignment as Moderation

We have conducted further PLS analysis with a bivariate approach in order to get more detailed results related to our model. As researchers (Drazin & Van de Ven, 1985) have stated, systems approach provides information about the whole model where bivariate approach provides more details about the components of the model. Although detailed results can provide valuable information, researcher should keep in mind the limitations about bivariate approach (i.e., unstable and un-independent (Chan et al. 1997)). Our results for the model of alignment as moderation with bivariate approach are shown in Figure 35. Alignment has positive and significant relationship with relative financial performance (β=0.22 and significant at 0.05 level) and product-service innovation (β=0.32 and significant at 0.01 level) while it does not have any significant relationship with absolute financial performance. Although the APC value is 0.235 and significant ($p<0.01$) the ARS value was not significant. This may indicate problem in the fit of the model. Considering the concerns in literature, these results were not surprising because of the nature of the bivariate analysis.

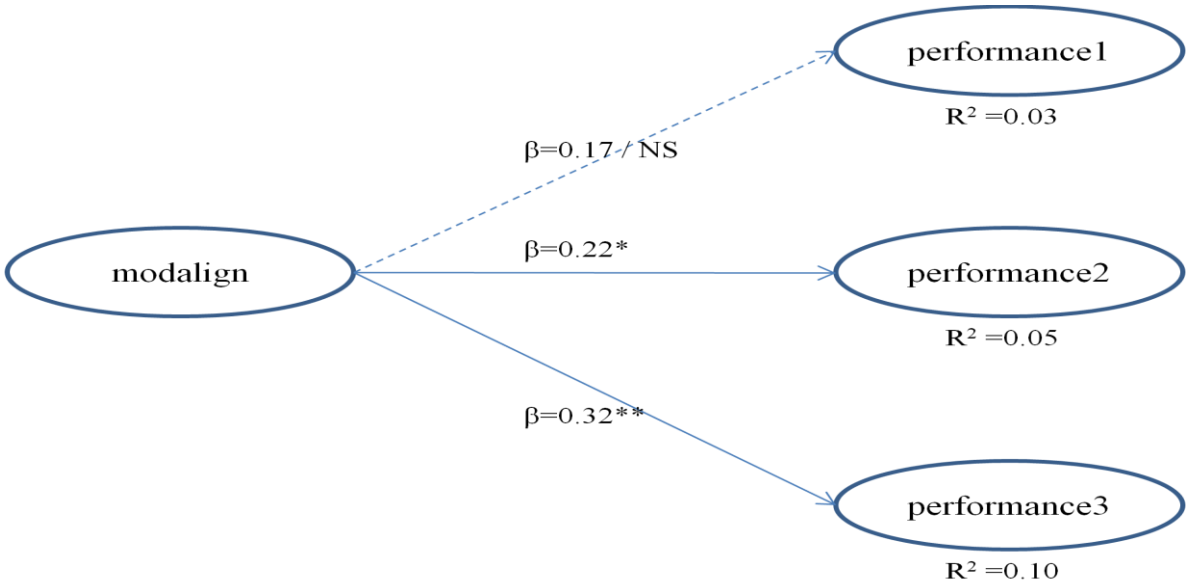

Figure 35 Path Coefficients in SEM for Alignment as Moderation – Bivariate Approach

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
Modalign: Alignment as Moderation
Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

Further bivariate analysis includes the model with strategic ERP flexibility (see Figure 36). The results reveal although the results in systems approach are good, when examined in detail, not all the individual items contribute to that positive relationship. The surprising finding about the analysis was, although it was 0.1 level, there were significant results between flexibility and product-service innovation. The model fit is acceptable since APC is 0.230 ($p<0.01$) and ARS is 0.207 ($p<0.01$) and AVIF is 1.906, indicating no risk of multicollinearity.

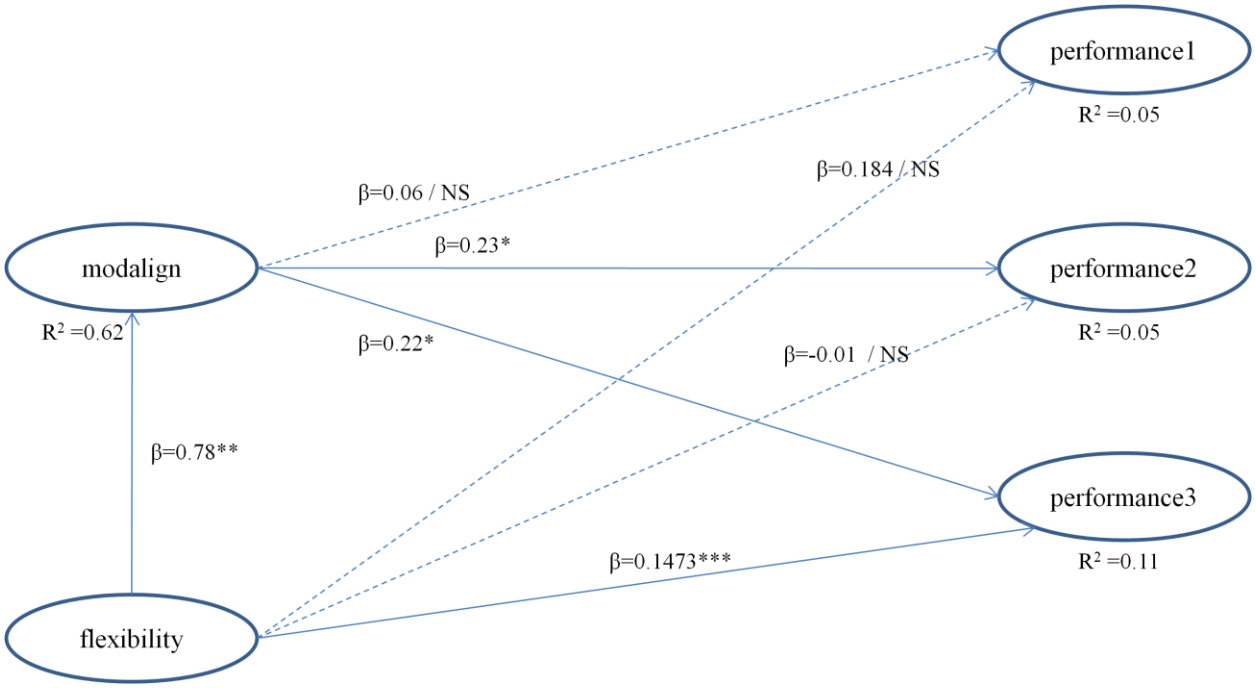

Figure 36 Path Coefficients in SEM for Alignment as Moderation with Flexibility – Bivariate Approach

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
Flexibility: Strategic ERP Flexibility
Modalign: Alignment as Moderation
Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

4.1.2.2 Alignment as Profile Deviation

Following the analysis for alignment as moderation, we have used the same approach for alignment as profile deviation (see Figure 37). It is not very surprising that findings for profile deviation are similar to the findings of moderation. Alignment (as profile deviation) is positively correlated with relative financial performance (β=0.35 and significant at 0.1 level) and product-service innovation (β=0.26 and p<0.01) but does not have a significant relationship with absolute financial performance. APC value for the model is 0.286 and significant at 0.01 level; however, ARS value is not significant for the model. Therefore, we can argue the model does not fit perfectly.

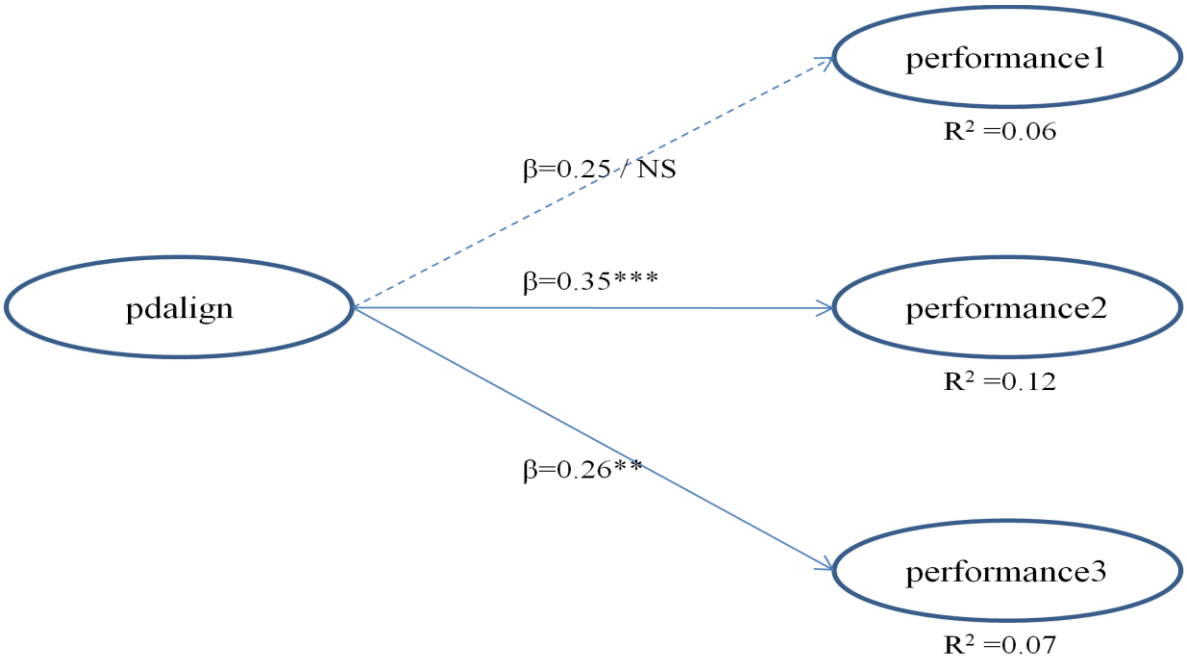

Figure 37 Path Coefficients in SEM for Alignment as Profile Deviation – Bivariate Approach

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
pdalgn: Alignment as Profile Deviation
Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

The results of bivariate analysis with profile deviation are similar to bivariate moderation analysis (see Figure 38). The relationships between alignment and performance are significant except absolute financial performance. Likewise, we find a positive a significant relationship between strategic ERP flexibility and product-service innovation ($\beta=0.22$; $p<0.05$). The model fit was acceptable with APC value being as 0.250 ($p<0.01$), ARS value being as 0.205 ($p<0.01$), and AVIF value being less than 0.5 (1.378).

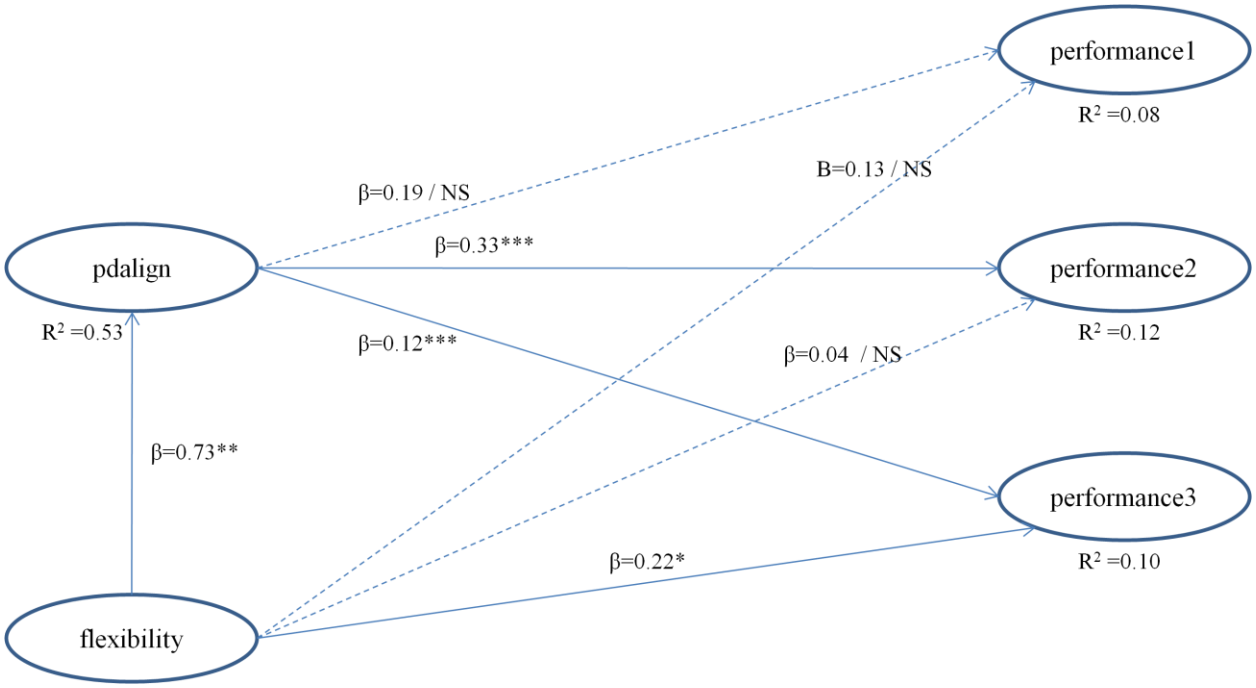

Figure 38 Path Coefficients in SEM for Alignment as Profile Deviation with Flexibility – Bivariate Approach

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
flexibility: Strategic ERP Flexibility
pdalign: Alignment as Profile Deviation
Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

4.1.3 Bivariate Examination of Alignment and Performance

Literature suggests both the bivariate and systems approach have different contributions to the research. Therefore, in our analysis, in order to have a broader understanding of the alignment of ERP, we have conducted our analysis with both approaches for both fit as moderation and fit as profile deviation. In order to provide more details about the relationship between performance and alignment, we have conducted the further analysis with all sub-categories of alignment and sub-categories of performance.

In this step, we have analyzed the components of the model in bivariate approach; but from a different perspective. We have examined the bivariate relationship between performance and flexibility and the components of strategy. Based on the findings shown in Table 54,

defensiveness and aggressiveness attributes of business do not have a significant relationship with ERP flexibility while analysis and risk aversion attributes of ERP do not have significant relationship with ERP flexibility. Interestingly, results indicate there is a negative and significant relationship between risk aversion attribute of business and ERP flexibility, which indicates the more flexible organizations' ERP are, the more organizations can take business risks.

Table 54 Path Coefficients for Bivariate Approach for Business Strategy Types and Performance and Flexibility

Domain	Strategy Type	Flexibility	Performance
Business Strategy	*Defensiveness*	0.18 / NS	0.16***
	Analysis	0.29**	0.41**
	Aggressiveness	0.01 / NS	0.07 / NS
	Risk Aversion	-0.16*	-0.22 / NS
	Futurity	0.17*	-0.03 / NS
Enterprise Systems Strategy / Support for	*Defensiveness*	0.51**	-0.08 / NS
	Analysis	-0.05 / NS	0.28*
	Aggressiveness	0.28**	0.03 / NS
	Risk Aversion	0.10 / NS	0.09 / NS
	Futurity	0.17**	0.13 / NS

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
****: Correlation is significant at the 0.1 level (2 tailed)*
NS: Not Significant
Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

Examining the strategy attributes and general performance as well as detailed performance components can provide valuable information as well. Our results reveal only defensiveness and analysis of business attributes have positive and significant relationship with general business performance while only analysis attribute of ERP has positive and significant relationship with business performance. Detailed examination of business performance shows us risk aversion does not have a significant relationship with product and service innovation for ERP attribute but is negatively related to product and service innovation for business attribute. This can be interpreted as the organizations that are not willing to take risk are usually not performing well in terms of new product and service innovation. On the other hand organizations that apply the defensive, analysis, aggressive, or futurity attribute of either ERP or business have positive and significant relationship with product and service innovation.

Furthermore, while organizations having analysis type of business attribute have positive and significant relationship with both absolute and relative financial performance, organizations with futurity business attribute has positive and significant relationship only with absolute financial performance (see Table 55). In addition, organizations with risk aversion and analysis attributes of ERP have positive and significant relationship with both absolute and relative financial performance; organizations with defensive attribute of ERP have positive and significant relationship only with relative financial performance.

Table 55 Path Coefficients for Bivariate Approach for Business Strategy Types and Performance

Domain	Strategy Type	Performance1	Performance2	Performance3
Business Strategy	*Defensiveness*	0.25 / NS	0.19 / NS	0.23*
	Analysis	0.35**	0.36**	0.40**
	Aggressiveness	-0.13 / NS	-0.05 / NS	0.24**
	Risk Aversion	-0.19 / NS	-0.24 / NS	-0.28**
	Futurity	0.19**	0.13 / NS	0.27**
Enterprise Systems Strategy / Support for	*Defensiveness*	0.21 / NS	0.20*	0.23*
	Analysis	0.22**	0.25**	0.39**
	Aggressiveness	-0.24 / NS	0.10 / NS	0.22***
	Risk Aversion	0.20**	0.24*	0.20 / NS
	Futurity	0.21 / NS	0.20*	0.23*

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
****: Correlation is significant at the 0.1 level (2 tailed)*
NS: Not Significant
Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

We have conducted correlation analysis to test our hypotheses from the bivariate perspective (see Table 56). Therefore, we have examined the correlations between bivariate performance measures and the alignment types as moderation and profile deviation. Table 56 shows both alignment as moderation and alignment as profile deviation are positively and significantly correlated with performance while considering the systems approach. The correlation coefficient between alignment as moderation and performance is 0.306 (significant at 0.10 level) and between alignment as profile deviation and performance is 0.231 (significant at 0.05 level). Bivariate approach gives more details on an individual level. Therefore, we have checked the correlations among alignment types and individual level performance measures. Our

results reveal that alignment as moderation is positively correlated with relative financial performance (0.215 at 0.05 significance level), and product-service innovation (0.312 at 0.01 significance level). We have not found any significant relationship between alignment as moderation and absolute performance with bivariate approach. Likewise, alignment as profile deviation is positively correlated with only product-service innovation at bivariate approach. Flexibility is positively correlated with both alignment types (0.784 and 0.709 at 0.01 significance level with alignment as moderation and alignment as profile deviation, respectively).

Table 56 Bivariate Correlations among Performance, Strategic ERP Flexibility, and Alignment Types

Constructs	Perf1	Perf2	Perf3	Perf	Flexibility	ModAlg	PDAlg
Perf1							
Perf2	.391**						
Perf3	.209*	.215*					
Perf	.733**	.778**	.637**				
Flexibility	.083	.151	.275**	.233*			
ModAlg	.136	.215*	.312**	.306**	.784**		
PDAlg	.101	.168	.229*	.231*	.709**	.714**	

Notes:

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Perf1: Absolute Financial Performance
Perf2: Relative Financial Performance
Perf3: Product-Service Innovation
Perf: Performance
Flexibility: Strategic ERP Flexibility
ModAlg: Alignment as Moderation
PDAlg: Alignment as Profile Deviation

In order to examine multicollinearity, we measured Variance Inflation Factor (VIF) values. Our results indicate that all the VIF values are below the threshold value of five. Therefore, they are not indicating any significant risk for multicollinearity.

As Sabherwal & Chan (2001) state, both correlation analysis and regression analysis can be used to test out hypotheses. Although the authors recommend correlation analysis, to confirm the results of the study, we have included the regression analysis as well. Therefore, we have analyzed the relationship between alignment and performance through regression analysis. The regression analysis supports our hypothesis regarding the association of alignment and

performance. Regression analysis of both alignment as moderation and profile deviation are significant and R-square values are 0.094 and 0.053, respectively. In addition, our results indicate the regression analysis among alignment as moderation and alignment as profile deviation are also positive and significant (see Table 57).

Table 57 Regression Analysis between Alignment as Moderation and Profile Deviation, and Performance and Flexibility

Independent Variable	Dependent Variable	R Square	F Stats	Sig.	Standard. Coefficient	Model	T Value	Sig.
Alignment (Moderation)	Performance	0.094	9.310	0.003	0.306	Constant	10.441	.000
						IV	3.051	.003
Alignment (Prof.Deviat.)	Performance	0.053	5.055	0.027	0.231	Constant	28.670	.000
						IV	2.248	.027
Flexibility	Alignment (Moderation)	0.644	162.744	0.000	0.802	Constant	5.262	.000
						IV	12.757	.000
Flexibility	Alignment (Prof. Deviat.)	0.541	106.260	0.000	0.736	Constant	-16.929	.000
						IV	10.308	.000

ANOVA results reveal the means for alignment as profile deviation as they are for alignment as moderation is significantly different from each other. In other words, Table 58 shows there is a significant difference in the alignment as profile deviation for three different levels of flexibility. We also observe the alignment mean is the lowest when flexibility is low. Moreover, alignment mean is higher for the medium level of flexibility, and at its highest for the high flexibility level (see Table 59).

Table 58 ANOVA Results for Alignment as Profile Deviation Based on Flexibility Level

Construct	Level of Flexibility	Mean	Standard Deviation	Mean Squares	F Value	Sig.
Alignment as Profile Deviation	Low	-1.702	0.401	0.144	35.394	0.000
	Medium	-1.041	0.407			
	High	-0.560	0.305			

Table 59 Post Hoc Tests for Alignment as Profile Deviation Based on Flexibility Level

Construct	Levels of Flexibility		
Alignment as Profile Deviation		Medium	High
	Low	-0.662**	-1.143**
	Medium	-	-0.481**

Table 60 Correlation between Alignment (Profile Deviation) and Performance, and Flexibility: Systems Approach

	All Cases	Prospector	Differentiation	Analyzer	CostLeader	Defender
Performance	0.223*	-0.414	0.122	0.315*	0.530**	0.656*
Flexibility	0.723**	0.921**	0.807**	0.918**	0.815**	0.509

Table 60 shows alignment (as profile deviation) and performance and ERP flexibility are positively and significantly associated. Further examination on business strategy profiles reveals there is no significant relationship between performance and alignment when organizations' strategy profile is either prospector or differentiation. On the contrary, our results show the positive relationship between performance and alignment for the organizations with analyzer, cost leader, and defender strategy profiles. In addition, our results indicate a positive and significant (0.05 level) relationship between alignment and flexibility except the defenders. This leads us to not accept the hypotheses 4 and 5.

After conducting the required analysis, our results indicate our hypotheses have been supported. Table 61 shows the status of all hypotheses.

Table 61 Summary of Hypotheses and Their Status

Hypotheses	Status
Hypothesis 1: There is a positive relationship between alignment and business performance.	Supported
Hypothesis 2: There is a positive relationship between flexibility and business performance through alignment.	Supported
Hypothesis 3: The level of strategic ERP flexibility is positively associated with alignment	Supported
Hypothesis 4: For Prospectors, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Flexibility.	Not Supported
Hypothesis 5: For Differentiators, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Process Orientation.	Not Supported
Hypothesis 6: For Analyzers, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Integration.	Supported
Hypothesis 7: For Cost Leaders, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Effectiveness.	Supported
Hypothesis 8: For Defenders, there is a positive relationship between business performance and the alignment of ERP strategy and ERP for Efficiency.	Supported

4.1.4 Alternative Analysis

Although alignment as moderation is superior to alignment as matching and suggested in literature, we have conducted tests regarding alignment as matching to show our results are consistent with the literature. The next tables summarize our findings and give readers a chance to compare the differences in terms of our hypotheses of three alternative measurement types. Additional analysis are in Appendix E-H.

As the Table 62 represents, §1 and §2 in the second column belong to alignment as moderation and alignment as profile deviation, from systems approach view, as mentioned earlier. The third column shows the path coefficients between alignment and flexibility, alignment and performance, and performance and flexibility. The fifth column explains the R-Square for alignment (either moderation or performance) while last three columns represent the model fit in terms of Average Path Coefficients (AFC), Average R-Squared (ARS), and Average Variance Inflation Factor (AVIF) values. The additional part in this table is the values for alignment as matching as shown in §3 of the Table 62. As mentioned previously, alignment as matching has been measured through four different methods. The model fit for all models are acceptable except matching3 approach. For this model, APC value is not significant which might

indicate poor fit for the model. Comparison of alignment as matching and other two methods tells us the path coefficients, R-Squared and model fit are generally better for moderation and profile deviation approach as the literature suggests. Meanwhile, although alignment as matching is less powerful compared to other two methods, the results are still parallel to our findings.

Table 62 Path Coefficients and Significance Levels among Constructs on Moderation, Profile Deviation, Matching Type of Alignment with Systems Approach for Alignment, Performance, and Flexibility

Approach	Alignment Type – Constructs			Relational Constructs		R^2	Model Fit		
				Alignment	Flexibility		APC	ARS	AVIF
Systems	Moderation		Alignment	-	0.78**	0.62	0.365**	0.353**	2.254
			Performance	0.26*	0.05 / NS	0.09			
	Profile Deviation		Alignment	-	0.73**	0.53	0.367**	0.324**	1.452
			Performance	0.30*	0.07 / NS	0.12			
	Matching	*Match1*	*Alignment*	-	*0.69***	*0.47*	*0.342***	*0.284***	*1.552*
			Performance	*0.24***	*0.10 / NS*	*0.10*			
		Match2	*Alignment*	-	*0.32*	*0.10*	*0.242***	*0.101****	*1.043*
			Performance	*0.20***	*0.20**	*0.10*			
		Match3	*Alignment*	-	*0.61***	*0.37*	*-0.180*	*0.223***	*1.167*
			Performance	*-0.13 / NS*	*0.20**	*0.07*	*/ NS*		
		Match4	*Alignment*	-	*0.79***	*0.62*	*0.370***	*0.363***	*2.420*
			Performance	*0.32***	*-0.01 / NS*	*0.10*			

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*
NS: Not Significant
Match1: Fit as Matching with Absolute Difference
Match2: Fit as Matching with Signed Difference
Match3: Fit as Matching with Squared, Summed Difference
Match4: Fit as Matching with Summed Interaction
APC: Average Path Coefficient
ARS: Average R-Square
AVIF: Average Variance Inflation Factor
Flexibility: Strategic ERP Flexibility

We have conducted the same calculations for alignment as matching from the bivariate approach perspective (see Table 63). Usually the path coefficients are relatively smaller for alignment as matching except matching4. However, as literature suggests, the findings about bivariate approach is unstable. Generally, while the relationships or fit for alignment as moderation and alignment as profile deviation, alignment as matching sometimes have not provided the similar results. In addition, the four types of alignment as matching are sometimes conflicting.

Table 63 Path Coefficients and Significance Levels among Constructs on Moderation, Profile Deviation, Matching Type of Alignment with Bivariate Approach for Alignment, Performance, and Flexibility

Approach	Alignment Type – Constructs			Relational Constructs		R^2	Model Fit		
				Alignment	Flexibility		APC	ARS	AVIF
Bivariate	Moderation		Alignment	-	0.78**	0.62	0.230**	0.207**	1.906
			Perf1	0.06 / NS	0.184 / NS	0.05			
			Perf2	0.23*	-0.01 / NS	0.05			
			Perf3	0.22*	0.147**	0.11			
	Profile Deviation		Alignment	-	0.73**	0.53	0.250**	0.205**	1.378
			Perf1	0.19 / NS	0.13 / NS	0.08			
			Perf2	0.33***	0.04 / NS	0.12			
			Perf3	0.12***	0.22*	0.10			
	Matching	*Match1*	*Alignment*	-	*0.69***	*0.47*	*0.225***	*0.171***	*1.499*
			Perf1	*0.17**	*0.16 / NS*	*0.07*			
			Perf2	*0.18**	*0.05 / NS*	*0.04*			
			Perf3	*0.12****	*0.22***	*0.10*			
		Match2	*Alignment*	-	*0.32***	*0.10*	*0.208***	*0.091 / NS*	*1.304*
			Perf1	*0.18**	*0.22 / NS*	*0.08*			
			Perf2	*0.13****	*0.13 / NS*	*0.04*			
			Perf3	*0.24***	*0.24***	*0.14*			
		Match3	*Alignment*	-	*-0.61***	*0.37*	*-0.047 / NS*	*0.164***	*1.043*
			Perf1	*0.16 / NS*	*0.22 / NS*	*0.07*			
			Perf2	*-0.25 / NS*	*0.11 / NS*	*0.09*			
			Perf3	*-0.19***	*0.24**	*0.12*			
		Match4	*Alignment*	-	*0.79***	*0.62*	*0.235***	*0.213***	*1.932*
			Perf1	*0.09 / NS*	*0.17 / NS*	*0.05*			
			Perf2	*0.28**	*-0.05 / NS*	*0.06*			
			Perf3	*0.24**	*0.13****	*0.12*			

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*
NS: Not Significant
Match1: Fit as Matching with Absolute Difference
Match2: Fit as Matching with Signed Difference
Match3: Fit as Matching with Squared, Summed Difference
Match4: Fit as Matching with Summed Interaction
Perf1: Absolute Financial Performance
Perf2: Relative Financial Performance
Perf3: Product-Service Innovation
APC: Average Path Coefficient
ARS: Average R-Square
AVIF: Average Variance Inflation Factor
Flexibility: Strategic ERP Flexibility

5 Chapter: Discussion, Conclusion and Implications

Business performance interacts with other functions of business and Enterprise Systems (ES), either directly or indirectly. Alignment of ES with business strategies and its flexibility are among the most important factors that academics have cited for last several years that have impact on performance (Chan & Reich, 2007; Luftman & Ben-Zvi, 2010; Tallon & Pinsonneault, 2011). Enterprise Resource Planning (ERP) systems are considered as the strategic component of ES and they are at the top of the project list for any company. Therefore, not only ERP but also the strategy concept should be studied in order to get a better understanding of business performance. In this study, we have examined the relationship between business performances and fit between a technology component and strategy. In addition, theorizing the role of strategic ERP flexibility provided a better understanding of alignment and its antecedents. In summary, our research examines the nature of relationship between these three constructs within enterprise systems context.

Considering the alignment of business and ERP allow organizations to adapt to dynamic environments (Chung et al. 2003) faster and more efficiently, we can argue that aligned business strategies with ERP strategies will make the adaptation to the dynamic environment of business quicker. On the other hand, ERP flexibility helps organizations to update their technical structure more effectively and faster and adapt or react to the expected or unexpected conditions of business requirements through effective and supportive use of enterprise systems (Tian et al. 2009; Langdon, 2006; Chung et al. 2003; Hirschheim & Sabherwal, 2001; Byrd, 2000; Broadbent, Weill, & Neo, 1999; McKenney, 1995; Evans, 1991). Having access to up-to-date and right technology with the ability to use it would bring competitive advantage to an organization over its competitors; thus leading to an increase in the performance of that organization. The following discussion elaborates three main issues: requirements for an alignment study (i.e., approach for testing an alignment study, alignment measurement), strategy concept, and strategic ERP flexibility.

Theoretical development is critical for the success of any research. Researchers also need to identify study-specific conditions or constraints in addition to theoretical development in the study. Aforementioned ES and alignment literatures show alignment is a broad and complex

issue. Therefore, identifying the constraints helps researchers to appropriately answer their research questions about alignment. Since the alignment topic is relatively broad, we mention some of the most common issues that alignment researchers may face. Researchers need to identify the type of alignment; whether it is strategic alignment, structural alignment, business alignment, ES alignment, cross-dimensional alignment, or alignment mechanisms (Sabherwal et al. 2001). This helps researchers to identify the path they choose and the potential constructs they can use.

Approach to the alignment concept is also critical especially when conducting an empirical study about it, or its measurement (Drazin & Van de Ven, 1985). This perspective can help researchers identify the level of detail of their alignment researches. Researchers can examine alignment from a broad perspective (systems approach) or they can disaggregate the constructs and focus each of them in more detail (bivariate approach). Whether they use dependent variable or not, (selection approach - context-structure relationship) it can help them to design research more effectively.

Researchers need to state the duration of an alignment study (whether it has short term effects or long term effects), the perception of alignment (whether alignment is an end state or a process), the level of alignment (whether its measurement is firm level, business unit level, or process level), the measurement type of alignment when it requires a calculation of fit (fit as moderation, fit as mediation, fit as matching, fit as profile deviation, fit as gestalt, fit as covariation) (Chan & Reich, 2007; Venkataramanan, 1989), etc. whenever possible to identify and work more effectively with alignment research.

In this study, we have examined strategic alignment and used alignment as moderation and profile deviation from both systems approach and bivariate approach. ERP systems are considered strategic tools. However, in order for ERP to contribute to business value or performance, ERP strategies need to be aligned with business strategies. In that sense, we agree with Kang et al. (2008) in arguing that ERP systems must be strategically aligned with business to provide superior performance.

First, we started with the systems approach. After conducting the appropriate analysis with the data, our results show alignment has a significant and positive impact on performance. Although a combination of different business strategies has been tested in our study, our results support findings of previous studies where researchers adapted different perspectives on the elements of this research (Chan & Reich, 2007; Chan et al. 2006; Avison et al. 2004; Papp, 2001; Sabherwal & Chan, 2001; Galliers, 1991). In addition, individual examinations of flexibility and performance, and alignment and performance reveal these constructs are related to each other. Further examination of the constructs enhances our understanding about the relationships among them when they are interacting. As we expected, our results showed flexibility had an impact on performance through alignment in addition to its individual impact. In other words, alignment in this study mediates the relationship between flexibility and performance.

Based on our results, we argue that alignment is a critical factor with an impact on performance. On the other hand, having access to the most-up-to-date technology does not always have to guarantee superior performance. A flexible ES or ERP contributes to improvement of the performance; this impact is more likely to be greater through alignment. In this context, our results support Chung et al. (2003) whose findings indicate ES flexibility has impact on alignment. In addition, our results are parallel with Duncan's (1995) statement regarding a flexible ES improving the performance of organizations, and indicate flexibility of ERP systems has a role on performance change when there is strategic alignment between business and ERP. Our results also reveal a positive relationship between flexibility and performance. When the flexibility has an impact on performance (through the alignment), higher flexibility leads to better performance. Our findings also support the general perspective about alignment: organizations search for ways to support alignment (Bergeron et al. 2004; Mies & Snow, 1984). Therefore, it is normal to expect findings that reveal alignment behaves as a mediator between two constructs, such as strategic ERP flexibility and business performance.

Further analyses on the individual components of strategy, such as "defensiveness", "analysis", "aggressiveness", "futurity", and "risk aversion", provide us more detailed findings. Based on the literature (Chan, 1992; Venkatraman, 1989), aggressive companies can risk their cash flow, sacrifice their short-term profitability, or set their prices below the competition in

order to keep their market share. Since aggressive companies risk their cash flow via low prices and profitability, their financial performance should be negatively correlated with their strategy, at least for the short term. Our results did not show any significant relationship between aggressive strategy and performance (there was a negative correlation, but it was not significant). The reason might be short-term effects of the strategy. In other words, in the long-term, organizations may gain some profit and this can be compensating the short-term disadvantage of the strategy. However, we believe ES literature will benefit from further research on the differentiation between short-term and long-term effects of the strategy on the performance. In addition, our results indicate aggressive strategy has a positive and significant relationship with product-service innovation. These results are also consistent with ERP strategy part that states a positive and significant relationship with product-service innovation. A plausible explanation might be the nature of the technology. Since ERP require time and resource to realize the promised benefits, their return on performance will be in the long-term. Therefore, aggressive strategy can improve the product-service innovation component of business performance over time.

"Analysis" attribute of the ERP and business strategy has a positive and significant relationship with all three types of performance, absolute financial performance, relative financial performance, and product-service innovation. Companies with analysis strategy focus on detailed analysis for decision making. These companies not only conduct long-term research for getting a future competitive edge, but also use the outcomes of their research and comprehensive analysis in their short term decision making as well. Therefore, our results state companies which focus on detailed analysis for decision making have an improved performance, absolute and relative, as well as superior product-service innovation. These companies use their ERP in an effective way parallel with their business strategies and at the end have improved performance. In addition, the detailed analysis allows these organizations to identify and evaluate business opportunities and provide effective solutions to business problems. Therefore, these organizations use their ERP from a flexible perspective to react to the expected or unexpected conditions of business requirements.

Companies with defensive strategy focus on quality, having better relationships with other parties involved in business (i.e., customers, suppliers) and an improved network, monitoring their performance, and most importantly direct these abilities to defend their market share. Our results reveal these companies have improved performance regarding product-service innovation. The use of ERP in order to support these activities allows them to improve their product-service innovation as well.

Companies that rely on forecast, trend analysis, and what-if type of analysis more likely have improved relative financial performance and product-service innovation. When these organizations use their ERP to support their business activities parallel to their strategy, they have improved absolute financial performance as well. Using ERP and benefiting from the strategic flexibility of the system allows the organizations that adapt the futurity type of strategy attribute to improve their business performances.

Last but not the least, organizations following a strategy that leads them to avoid risks has a negative performance indication regarding product-service innovation. In other words, doing business sometimes requires taking risks and avoiding risks may cause companies to face situations where they may lose their competitive edge. Developing new products and services leads to serve customers better and thus an increase in competitiveness. However, by using their ERP in decision making and avoiding calculated risks (i.e., following "tried and true" paths), organizations may have improved their absolute performance and their relative financial performance. In addition, the negative relationship between strategic ERP flexibility and the risk aversion type of strategy indicate when organizations use their ERP in a flexible manner (adapt or react to the expected or unexpected conditions of business requirements through effective and supportive use of their ERP), they should be open to take business risks, at least to some degree.

Examination on business strategy profiles reveals interesting results. Sabherwal & Chan (2001) examined the relationship between alignment and business performance and their results showed alignment and performance are positively associated for prospectors and analyzers; however, for defenders, there is no such an association. In addition, Raymond & Croteau (2000) examined performance under two categories: productivity and profitability. Their results show

that alignment and productivity are positively associated for prospectors and defenders, but they did not find any association for analyzers. In terms of profitability, they found a positive association with alignment for analyzers, but not for prospectors and defenders.

Our results show for prospectors and differentiators, alignment does not have positive association with performance, while analyzer, cost leader, and defender have positive and significant association with performance.

In their study, Sabherwal & Chan (2001) examined alignment with generic enterprise systems. The literature shows ERP systems are different from traditional or generic enterprise systems (Muscatello, Small & Chen, 2003). While generic systems can be adapted and implemented in a short time, ERP requires extensive time and effort to be used effectively. Therefore, the very nature of ERP systems, in terms of resources, cost, risks, amount of commitment, etc., makes organizations think twice before investing in such a system. In this case, organizations need to make detailed plans and consider all possibilities before making their investment. Because of these facts, prospectors, (who are willing to take risk, do not have formalization, have a willingness to be the first, etc.) have characteristics in conflict with the ERP requirements. Therefore, this explains the non-association between prospectors and alignment in case of ERP systems. In addition, these organizations, if they successfully implement their ERP system, would try to use the system for finding additional market opportunities. The strategic flexibility of ERP systems would allow them to do that. Therefore, the nonsignificant relationship can be explained by less successful attempt to get ERP because of their nature. As Govendarajan (1986) and Hambrick (1983) stated, prospectors and differentiation can be considered very similar, the same explanation can be applied to explain the non significant relationship between alignment and performance.

The nature of analyzers makes them more realistic while taking risks. Analyzers spend time on analyzing the pros-cons of the situation before making decision. They seek efficiency through high level analysis. It is not surprising to get positive association between alignment and performance for analyzers. Cost leaders and defenders would be more interested in control and stability. They would play it safe. Therefore, they would follow the plan-act-evaluate approach.

Considering the extensive amount of organizations implementing ERP systems, these two types of organizations would be convinced about the requirement of having an ERP system. After a while, not having an ERP system while all other competitors have one might cause an organization to go out of business. Therefore, after examining the business environment and being sure about the need of implementing, these two organizations would have an ERP system and strategically use it for their purposes. This explains the positive association between alignment and performance. These results support Sabherwal & Chan (2001) and Raymond & Croteau (2000) who stated there is no universally accepted condition for strategic alignment (p.25; p.199).

Bivariate analyses on business performance perspective also revealed more detailed results about our research. Flexibility is positively associated with business performance. The readers should not be confused with the nonsignificant relationship between ERP flexibility and business performance on PLS analysis. Further PLS analysis (Figure 30) reveals strategic ERP flexibility and performance is positively associated; however, when we include alignment in the model, the relationship between strategic ERP flexibility and business performance becomes nonsignificant. The reason for nonsignificance is the inclusion of the mediator variable (Sobel Method). As explained before, the mediation of alignment makes the relationship between ERP flexibility and performance nonsignificant. This relationship merely confirms our argument that alignment is a mediator and strategic ERP flexibility is positively associated with business performance, individually and through alignment. Detailed analysis of bivariate approach from the business performance perspective reveals that strategic ERP flexibility is positively associated with only product-service innovation. However, considering the statements of researchers (Chan et al. 1997; Drazin & Van de Ven, 1985) these results are not surprising. They state when a construct is examined through a bivariate approach, since the factors, which contribute to that main construct are not independent, the bivariate analysis may not provide much information. Based on this statistical argument, the only comment we can make is that systems approach provides more stable results than bivariate approach and bivariate approach can be used for getting information regarding the individual independent relationships among the elements of the construct. In addition, according to our interpretation of the findings about

bivariate approach, we argue that ES in a flexible ERP environment improves the product-service innovation in an organization. This can be added to the findings of Chung et al. (2005) indicating an indirect impact of flexibility on performance. In other words, flexibility may be impacting more innovation type of strategies and in the long run the organization may be benefiting from the flexible nature of ERP and its use.

This research also contributes to the ES strategy with the topics from strategy field. We have adapted one of the most highly used strategy component by Venkatraman (1982), and the combination of Miles & Snow (1978) typology and Porter's (1980) typology (combined by Segev (1989)). This makes our research reach to a broader variety of businesses in today's current dynamic environment. For example, the combination of the two typologies allows us to reach to more concentrated industries (Porter's typology) and industries with more competitors (Miles and Snow typology). In addition, through this combination, our research can address and be generalized for both broader (such as industry or corporate) and a specific group of segment in a business.

Further examination on ERP flexibility reveals detailed information about the individual relationships between level of flexibility and the elements of alignment and performance. Our results show levels of flexibility is positively associated with alignment. Regardless of the type of alignment measure, we had the same results about the relationship between strategic ERP flexibility and alignment. Therefore, higher strategic flexibility will improve an organizations alignment. Examining the relationship between strategic ERP flexibility and bivariate performance measures shows that only product-service innovation is significantly different from other two performance indicators, absolute financial performance and relative financial performance. In addition, based on the level of strategic ERP flexibility, each business strategy attribute is significantly different from each other. This means each business strategy attribute reacts differently at different level of strategic ERP flexibility.

In short, our study addresses several "systematic extensions" mentioned in the literature (i.e., Sabherwal & Chan, 2001; Sabherwal et al. 2001; Chan et al. 1998; Chan, 1992; Venkatraman 1989) of alignment and ES. Our study is different from previous studies in terms of

the comprehensive nature of the model and the analysis. Although previous models have been tested for generic ES (Cragg et al. 2002; Sabherwal & Chan, 2001), our study differs in its enterprise systems focus. For example, Sabherwal & Chan (2001), with their study examined strategic alignment between generic ES and business strategies. They report alignment has an impact on performance for only prospectors and analyzers, not for defenders. On the other hand, our results show, when examining a specific ES component such as ERP, more business strategy types such as Analyzers, Cost Leaders, and Defenders have impact on business performance. In addition, we use a more comprehensive strategy component that has been theorized (Segev, 1989) but, to our knowledge, never been used before. Another contribution of our study is in terms of placing the ERP flexibility to the alignment literature. Our study can provide valuable information to the ERP alignment debate regarding the relationship between strategic ERP flexibility and business performance. A potential systematic extension mentioned by Sabherwal & Chan (2001) was the examination of several industries where the authors' focus was on a specific industry. As they suggested we have not focused on a specific industry. On the contrary, while we collected data from several industries, we adapted two common typologies that complement each other in terms of the variety of organization in an industry. As mentioned before ("Porter's typology focused mainly on more concentrated industries with larger business units while Miles and Snow's typology focused on industries with more competitors" (Segev, 1989, p. 500)), the typologies we have adapted help us to observe more types of organizations. Therefore, this study encompasses the general industry and it is relatively stronger in external validity than a single industry focus studies.

This study has addressed several calls and questions of Chan. Chan & Reich (2007) who stated alignment research needs more detailed analysis that will take the concept one step further than the "alignment is good" statement. Our results revealed alignment improves business performance and we can state; "alignment is good."

In addition, we argue in order to be able to contribute more, the constraints of an alignment study should be defined very clearly. For example, researcher need to define several aspects such as the nature and type of their alignment, direction of the alignment, type of measurement for alignment from both theoretical perspective and methodological perspective

(with justification), approach (congruent, contingency with system, bivariate, and selection), etc. After defining these types of constraints, researchers need to report their results. This type of detailed information would clarify more aspects on alignment and will take alignment research beyond the statement of "alignment is good." In other words, as Sabherwal & Chan (2001), Chan et al. (2006), and Raymond and Croteau (2009) stated there is no universal explanation on alignment: the answer is hidden in the details of alignment work.

In this study, we have come up with a potential explanation for Chan et al.'s (2006) question "Why does alignment often not lead to increased performance for defender firms?" The answer to this question is hidden in the detailed examination of the concepts. In their study, Sabherwal & Chan (2001) analyze data collected from financial services and manufacturing industry. The authors state that while alignment and performance are positively associated for prospectors and analyzers, for defenders, they report no such an association.

Raymond and Croteau (2009) examined alignment in more than 15 industries with 50 to 250 employees and reported alignment and productivity (second order performance measurement) are positively associated for prospectors and defenders, but they do not find any association for analyzers. In terms of profitability (second order performance measurement), they find a positive association with alignment for analyzers, while no association was significant for prospectors and defenders. Croteau and Bergeron (2001) examine alignment in manufacturing, service, and finance industries and report alignment is associated with performance for prospectors and analyzers. Another argument can be made based on the performance construct.

Raymond and Croteau (2009) have stated that based on the performance, whether it is measured through productivity or growth, the strategy profiles have different behaviors. For example, as the authors state, prospectors are positively associated (outperform) with alignment when performance is measured through growth (Jusoh, Ibrahim, & Zainuddin, 2006), and defenders are positively associated (outperform) with alignment when performance is measured through profitability (Zajac & Shortell, 1989). Raymond and Croteau (2009) argue the reason for these different findings may be based on the industry differences and organization size. In addition to these arguments, we state that type of ES might have an impact on the fluctuation of

these results. Considering the fact that ERP systems are strategic tools and different from traditional systems, they should be examined separately from other systems. ERP systems take approximately two more years to implement and yet, the success rate is not that high. Therefore, organizations, such as defenders, who have tendency to wait and see the market reactions and flow, will invest on the systems after a longer period of time. During this period, the major difficulties with the ERP systems can be eliminated and it can be safer to implement these systems. Therefore, defenders, by not implementing these systems immediately until they think they are safe, will have a higher success rate than other organizations who immediately implement the system.

Table 64 Summary of Recommendations/Findings

Discussion	Elements	Literature	Recommendations / Findings
Identify Requirements	Type	***Strategic Alignment*** Structural Alignment Business Alignment IS Alignment Cross-Dimensional Alignment Alignment Mechanisms	ES are strategic tools. ES should be aligned with business strategies (Kang et al. 2008). Strategic alignment is critical for the superior performance.
	Approach	***Systems Approach*** ***Bivariate Approach*** Selection Approach	Complex constructs should be tested with systems approach. Disaggregated relations for more detailed information should be tested with bivariate approach (Chan et al. 1997).
	Measurement	**Fit as Moderation** **Fit as Profile Deviation** Fir as Matching Fit as Mediation Fit as Gestalt Fit as Covariation	Fit as moderation is superior to fit as matching, from statistical and theoretical perspectives. Fit as profile deviation complements the findings of alignment as moderation (Venkatraman 1989).
	Other	Duration (long/short term) State (End State/Process) Level (Firm, Business Unit, Process), etc.	When applicable, researchers need to identify the details and constraints of their research design about alignment.
Strategy	Strategy Attributes	***Aggressiveness*** ***Analysis*** ***Defensiveness*** ***Futurity*** ***Proactiveness*** ***Riskiness / Risk Aversion*** ***Innovativeness***	Venkatraman's (1989) business strategy attributes can be used as strategy attributes for both ES and business. The attributed can be used for ES with the mirroring techniques (Chan, 1992).
	Strategy Profiles	***Prospector*** ***Differentiation (focus)*** ***Analyzer*** ***Cost focus/leadership*** ***Defender***	Combination of Miles and Snow and Porter's Typologies through Segev's approach. This combination allows access to more business types.
Strategic ERP Flexibility	Capability to adapt conditions. Effective and supportive use of enterprise systems.	Speed up operation, better/quicker response. Generate innovative solutions. Introduce new products or services. Closely observing competitors. Identify and evaluate new business opportunities. Accommodate efficient changes. Gives learning opportunity	Strategic ERP Flexibility improves business performance. The impact of strategic ERP flexibility is both direct and indirect, through alignment on business performance. In other words, alignment mediates the relationship between strategic ERP flexibility and business performance.

5.1 Implications

This study shows alignment improves performance and reveals to management ERP should be involved in decision making since it contributes to the performance (Chan et al. 1997). Alignment literature does not provide many alignment models. In addition, the amount of empirical studies about alignment is limited. An empirical study like this can help ES practitioners to prioritize their ES and ERP plans and investments (Chan et al. 1997).

When there is a shift in a business environment, organizations will probably need to assess it through their ERP and/or business strategies in order to keep up with or improve their performance (Bergeron et al. 2004; Sabherwal et al. 2001). In that case, this study will help managers and practitioners to guide and assess their situation.

Although alignment has been cited as one of the top three priorities of management for the last two decades, many organizations have failed in alignment of generic ES and business strategies (Symons, 2005). The main reasons that make reaching alignment difficult include alignment being unsustainable, "dynamic nature of strategic context, of characteristics of IT [ES] investment, and of development life cycles" (Tan & Gallupe, 2003) as well as business strategy being future oriented and dynamic in a way that it is affected by surrounding business environments (Tang & Walters, 2010). In order to succeed in alignment, organizations need to have a mechanism to "structure, process, and measure" business and ES throughout the whole enterprise. To this end, organizations can build ES steering groups composed of qualified people, make sure investment in ES/ERP are matching with alignment principles, and measure alignment correctly (Symons, 2005).

Alignment is a continuous process and it must be measured periodically. Organizations need to measure how they have done based on their strategic plans (Symons, 2005). Symons (2005) recommends three main categories for measuring strategic alignment: i) meetings regarding ES steering committee and ES business planning where both ES executives and top management come together (Lederer & Mendelow, 1989); ii) projects that measure the percentage of projects directly linked to strategic objectives that have a post-implementation

audit, and have ROI by business; and iii) budget regarding the new initiatives (Symons, 2005, p.4). Based on these suggestions, managers who use our instrument can measure the level of their alignment periodically and improve their situation with detailed meetings and discussions regarding how to proceed in order to sustain their alignment.

The practitioner-oriented version of the instrument of this study and the methods can be used to assess the organizations' realized business strategy instead of planned strategy (Sabherwal & Chan, 2001). This allows management teams to evaluate the business goals more effectively. We agree with Chan et al. (1997) who state planning or having intentions about a strategy or use of technology is not enough and not the same as the realized strategy or use of technology in the organization. Sometimes management can have ideals or plans for an effective strategy (or a technology in terms of their use); however, measuring business performance based on their plans is less realistic and useful than measuring performance and strategy based on realized perspective. In addition, the instrument developed for this study can be used as a tool to measure the realized strategy for ERP. Following Chan et al.'s (1997) study, organizations can be categorized as Proactiveness, Innovativeness, Analysis, Aggressiveness, Defensiveness, Futurity, and Risk Aversion in terms of ES support for the organization. While the organization is considered better for the greater number (our ES supporting our actions to be aggressive enough to improve our market share), the lesser number can be interpreted as a need for considering discussion (i.e. lower score for futurity means use of ES for forecasting is lacking). Therefore, upper level management (such as CEO and CIO) can discuss the business priorities based on the current situation of the organization. Proposals or investments for further modules for ES or ERP can be reviewed based on the match between portfolio or company action and the ES/ERP modules (Chan et al. 1998). This will also allow the management team to monitor the performance and progress achievements.

Neely et al. (1997) propose a framework in order to design a performance measure. This framework can be used for measuring whether the organization has reached their goals in terms of performance improvements. Measuring alignment with this study and identifying how much performance improvement has been accomplished can be followed through the Neely et al.'s (1997) study. Simply, the framework has ten elements the performance measurement team can

follow to identify the improvement in performance: i) Title; ii) Purpose of the measure (i.e., cost and lead time reduction, improvement in delivery, etc.); iii) Relates to (in terms of business objectives); iv) Target (amount, percentage, or level of improvement in performance to achieve); v) Formula (well and appropriately defined, controlled measurement to achieve target); vi) Frequency (amount of records or reports as a function of importance and available data); vii) Who measures (person responsible for collecting and reporting the data); viii) Source of data; ix) Who acts on the data; x) What do they do (setting up review teams for identifying problems regarding performance as well as their reasons and possible solutions to improve them; prepare an executive summary; and making the performance data available to all related parties); followed by notes and comments.

Although alignment improves the performance for organizations, it is unlikely to expect the same level of alignment from every organization focusing on alignment. "A priori, it was expected that most companies would employ the kinds of systems that supported their strategic orientations, i.e., companies would tend to have better IS [ES] strategic alignment. However, it was recognized that for various reasons, such as resource constraints or internal company turbulence, some companies would be more successful at developing appropriate systems than others - that is, some companies would have better IS [ES] strategic alignment" (Chan et al. 1997, p. 132). In this context, observing the alignment over a period of time and modifying the strategy or ES/ERP components based on the results of this observation can help organizations to achieve better alignment. Therefore, a study that provides the appropriate measurement of alignment would help practitioners.

Another application is to determine the current level of alignment (Avison et al. 2004). A management team can determine the organizational profile based on this study. After that, in order to state the indication of alignment, they might apply the projects for next year to the profile. Avison et al. (2004) state this type of combination of strategic planning and the prioritized projects, (based on financial terms, i.e., costs and benefits) ensure strategic alignment. This process can be repeated for specific time periods and a management team can then decide which project to proceed to achieve the perspective. The readers should keep in mind the

objective of this study is not to define how to achieve alignment; but to examine the impacts of alignment on business performance and identifying the level of alignment.

Because of the strategic importance of ERP systems, alignment of ERP should be included in strategic planning by management. Previously, the strategic planning was mainly done by professionals in technology departments or fields (Pollack, 2010). However, the strategic use of technology has led to other professionals being involved in the planning process. In some cases, when it comes to strategic planning, professionals from top management to stakeholders, ES people to customers, have been involved and participated through discussions, negotiations, etc. (Pollack, 2010; Lederer & Mendelow, 1989). Lederer and Mendelow (1989) call this coordination. This type of coordination is more beneficial to the organizations since it allows organizations to see i) whether their applications or systems are addressing the needs of organizations; ii) whether the systems still have the support and priority of stakeholders under the dynamic world of business; iii) and whether the ES and business objectives are still matching (Lederer & Mendelow, 1989). As described by Piccoli (2008) and Pollack (2010), planning process has five main stages: strategic business planning (including mission, strategy, etc.), enterprise systems assessment (evaluation of the current system), enterprise systems vision, enterprise systems guidelines, and strategic initiatives. An organization can employ one or a combination of a few planning technique (stages of growth, critical success factors, competitive forces model, three emerging forces, value chain analysis, e-business value matrix, linkage analysis planning, scenario planning, etc.), (Pollack, 2010; McNurlin, Sprague, & Bui, 2009). We recommend that regardless of the technique, management should consider the impact of ERP on the organization and proceed with their planning.

5.2 Study Limitations and Future Study

The main limitation of this study is sample size. Our sample of usable data consists of 92 responses. There were several reasons for the low response rate. It was difficult to identify and reach top management (CIO, CFO, and CEO) and those we did find had very tight schedules. There were company policies regarding not participating surveys, companies changing address, length of the questionnaire survey, and finding knowledgeable participants. Chan et al. (1997) state it is normal to get low response rates considering the fact the respondents are senior

executives and the topic requires some degree of sensitive strategic information. However, even these results can also provide us with valuable information regarding the validity of the instrument.

Data was collected through survey questionnaires and participants were asked to answer based on their perception of the performance. Therefore, one can also argue about the subjective nature of performance measure. However, literature shows perceptions are close enough to objective measures of alignment (Reich & Benbasat, 2000) and based on the size of the company, financial data may be unreliable or unavailable (Bergeron et al. 2004). Respondents may have also overstated their strengths regarding their orientation (Chan et al. 1997) or there might be a cognitive bias. In addition, several questions were about financial statements, which have objective measures. However, since several researchers (Cragg et al. 2002; Chan et al. 1997; Venkatraman, 1989; etc.) have proven the validity of the instrument and measurement, we have not foreseen any problems with proceeding with the extended instrument.

One may argue about the knowledge of a CIO or IT manager on organization's strategy. Pollack (2010) states "It is no coincidence that the emphasis on a more structured approach to planning for information systems occurred simultaneously with an increased emphasis on the role of the chief information officer (CIO). The CIO position evolved into prominence in the late 1980's when "technology grew from an expensive necessity to a strategic enabler" (Pearlson & Saunders, 2010, p. 220). The days of the CIO simply helping to control costs and reporting to the chief financial officer (CFO) evolved into a requirement to be aware of both the technical and business aspects of the organization, be on the same level as the CFO and report directly to the top executive of the organization (p. 221)" (p. 48-49). We can then argue that CIOs had knowledge about both ES and business strategy when they responded to our survey.

This study has been developed based on the contemporary versions of theories about strategy (Venkatraman, 1985) and alignment (Chan, 1992). Limitations regarding the strategy concept have been ignored for this study. We addressed the most cited limitations of Miles and Snow typology regarding the argument that it ignores a combination of strategies by combining it with Porter's typology. However, Avison et al. (2004) state that Miles and Snow typology is

not fully capable of "paradoxical decisions, excessive transformations and uncertain turnarounds". Although our approach of merged typologies eliminate some of these limitations, we are unsure how much of these limitations have been resolved.

Another limitation may arise because of the nature of the data. In this study, we have used cross-sectional data rather than a longitudinal study. Therefore, causality cannot be inferred. Finally, we have used one person per organization to respond to our survey. This may be evaluated as a response bias. Multiple respondents and triangulation from organizations would provide more accurate results (Bergeron et al. 2004). However, based on the firms (usually small and medium sized firms), it might not be possible to find another individual knowledgeable about ERP, business strategies, and performance (Bergeron et al. 2004).

As mentioned earlier, alignment has several antecedents and testing the model with one or more of these antecedents (i.e. management support, communication between ES and business departments, ease of integration, connection between ES and business plans, mutual understanding between ES and business departments, etc.) would add to the alignment and strategy literature. Other future studies may examine alignment at the process level or a longitudinal study that examines the alignment concept in more detail. In addition, studies about antecedent and enablers of strategic alignment under the concepts of flexibility and ERP systems, as well as other enterprise systems such as supply chain, customer relationship management, knowledge management; an ontology explaining the alignment concept from several perspectives (i.e., types of alignment, duration, state, etc.); and last but not the least, a study including Cost-Focus and Differentiation Focus (Porter, 1980) in the model would provide a deeper understanding of such a complex and important phenomenon as alignment.

Performance has been measured from different perspectives in literature. In our case, we used perceived business performance rather than financial performance based on company specific published corporate data. One reason was for the anonymity of participants and another due to the application of different accounting practices that would make the comparison of data very difficult.

5.3 Conclusion

Information is one of the most valuable assets that an organization can have. However, having the information is not enough to use it and benefit from it. How organizations use the information may provide a competitive advantage to the organization. This fact has lead organizations to look for ways to use the information in an optimum way. Applications to capture, store, modify, etc. the information may help organizations to access the information but with globalization and increasing needs of organizations, single applications do not address the need for right information in a 24x7 Enterprise Systems, therefore ERP systems have been developed in order to address this need.

ERP systems are different from traditional software because of their complex structures and intertwined nature with people and organizational processes. Choosing and installing software for ES is relatively easy, but this is not the case for ERP systems. Studies reveal ERP has many benefits to organizations such as integrating data, supporting business functions, customer satisfaction, better business performance etc. However, it is difficult to reap the benefits from ERP immediately. They require a detailed and careful plan before acquiring the system, during implementation, and after implementation. Considering they are expensive systems, failure of an ERP could cause both tangible and intangible cost to an organization. Meanwhile, research shows adopting an ERP system alone does not guarantee a competitive advantage or business performance benefits (Muscatello et al. 2003). ERP systems may require significant changes in business practices or even in the strategies of an organization. ERP projects are more successful when management understands their strategic importance and gives high priority to alignment. In other words, strategic alignment is a requirement for an ERP system's success (Esteves & Pastor, 1999; Gibson et al. 1999). In fact, most ERP projects either fail during implementation or conflict with the business strategy after adoption because of a mismatch in objectives (Stefanou, 2001). One way to avoid this mismatch is to align ERP and business strategies.

Standard theories in information systems (enterprise systems) focus on a universal information technology strategy. However, ES strategy is very complex to theorize and to use in practice because technology, arguably, can have endless functionalities to process information.

ES researchers also recommend increasing the granularity of alignment studies rather than using "one-size fits all" theories (Chan & Reich, 2007; Farrell, 2003; Palmer & Markus, 2000).

Alignment between business and Enterprise Wide Information Systems is a way to improve business performance and business value. However, there are different views about alignment in terms of its direction, structure, type, measurement, etc. Literature shows that while the right alignment brings the promised benefits to organizations, failure to align may cause huge damage.

Chan and Reich (2007) reported managers agreed to include ES alignment among their top priorities to improve the performance and add value to their businesses. Davenport (2000; 1998), Bingi et al. (1999), Gable et al. (2001), Holland and Light (1999), Rao (2000), and Al-Mudimigh et al. (2001) state organizations need to align their business strategies and even their business processes in order to be able to fully benefit from ERP systems. Several researchers find that ES alignment, when it is strategic, has indirect positive impacts through effectiveness and business profitability, as well as direct impacts on performance (Avison et al. 2004; Sabherwal & Chan, 2001; Venkatraman, 2000; Weill & Broadbent, 1998; Luftman, 1996; Porter, 1987). In addition, according to Kang et al. (2008) and Siswanto and Utomo (2008), aligning ERP with organizational goals would enhance the competitive benefits as well as the performance. These studies have inspired us to develop a measurement method to help practitioners and to theorize ERP alignment as an important subset of ES alignment to contribute in ES theory.

The complex nature of alignment and performance connection requires deeper examination because such concepts do not usually exhibit a simple independent/dependent variable relationship. Considering the fact that ERP is an enterprise wide information system encompassing information technology, flexibility of its structure would have an impact on alignment. Based on these facts, aligning ERP (a strategic component of ES) would enhance the business performance while improving the business value. On the other hand, organizations need to pay extreme attention during the alignment process in order to succeed.

Our study reveals both alignment and strategic ERP flexibility has a positive impact on business performance. In addition, strategic ERP flexibility has indirect impact on business performance through alignment. In other words, alignment mediates the flexibility/performance relationship rather than being a stand-alone independent variable. Our findings suggest ERP alignment is not just a simple function of ERP and business strategies; it is part of a relatively complex mechanism that incorporates the flexibility of an enterprise system. In that sense, our study is important since it confirms several findings about generic ES for ERP systems and does that through a set of suggested methods.

We also agree with researchers (Chan et al. 1997; Chan, 1992; Venkataraman, 1989) regarding the use of alignment type. We argue moderation approach is superior to matching approach and systems approach should be preferred to bivariate approach in a study of this type.

In conclusion, we argue alignment between business strategies and enterprise systems is a way to improve the business value of information and hence the business performance. Adopting flexible ERP systems is a way to reach strategic alignment. Based on these facts, aligning ERP, a strategic component of ES, would enhance the business performance while improving the business value. Alternatively, organizations need to pay attention to both ES and business strategies during the alignment in order to succeed. Managers need to consider the ERP strategy that will support and fit to their organizations' strategic orientation when they are conducting their ES planning (Chan 1992). However, prior to this research, they lacked a way to measure strategic ERP flexibility and ERP alignment. Our instrument provided the quantification for evaluation of ERP strategy, and ERP strategic fit. In addition, organizations can enhance their competitiveness to assess their business and ERP strategies (Chan 1992) through this study.

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Appendices

Appendix A. Measurement Items

Table A 1 Defensiveness Construct under Business Strategy and Related Questions

Construct	Questions: In your opinion, please indicate the extent to which you agree with the following statements as it relates to your business.
Defensiveness – Business Strategy	We secure our present market position prior to seeking new markets
	We develop strong relationships with our major customers
	We develop strong relationships with our suppliers (e.g., providers of key services, materials, finance)
	We put a lot of emphasis on (e.g., invest in) building the relationships we have with major customers, suppliers (e.g., providers of key services, materials, finance), and distributors
	We generally increase capacity (i.e., prepare to handle a greater volume of business) before our competitors do the same

Table A 2 Analysis Construct under Business Strategy and Related Questions

Construct	Questions: In your opinion, please indicate the extent to which you agree with the following statements as it relates to your business.
Analysis – Business Strategy	We carry out long-term research to provide us with a future competitive edge
	We require a great deal of factual information to support our day-to-day decision making
	When confronted with major decisions, we typically develop comprehensive analysis of the business situations faced
	The performance measures reviewed by the senior management team emphasize our long-term business effectiveness
	We tend to be highly analytical in our decision-making

Table A 3 Aggressiveness Construct under Business Strategy and Related Questions

Construct	Questions: In your opinion, please indicate the extent to which you agree with the following statements as it relates to your business.
Aggressiveness – Business Strategy	We sacrifice short-term profitability to gain market share
	Our strategic orientation includes/requires market share positions sought at the expense of cash-flow
	Our strategic orientation includes/requires a strong preference for setting prices below the competition

Table A 4 Risk Aversion Construct under Business Strategy and Related Questions

Construct	Questions: In your opinion, please indicate the extent to which you agree with the following statements as it relates to your business.
Risk Aversion – Business Strategy	We adopt a rather conservative view when making major decisions
	Our strategic orientation includes/requires business operations generally following 'tried and true' paths
	We tend to be risk-averse

Table A 5 Futurity Construct under Business Strategy and Related Questions

Construct	Questions: In your opinion, please indicate which contexts (model, techniques, and systems) are used in the business operations.
Futurity – Business Strategy	Forecasting of key indicators of business operations
	Studies of external technological developments (e.g., newly available materials, computer equipment)
	Systems for strategic business planning

Table A 6 Defensiveness Construct under ERP Strategy and Related Questions

Construct	Questions: In your opinion, please indicate the extent to which you agree with the statements as it relates to Enterprise Systems in your business.
Defensiveness – ERP Strategy	The Enterprise Systems used in the business unit provide us with information to defend our market position
	The Enterprise Systems used in the business unit enable us to develop stronger ties with major customers
	The Enterprise Systems used in the business unit enable us to develop stronger ties with major suppliers (e.g., providers of key services, materials, finance)
	The Enterprise Systems used in the business unit help us establish strong market links in general (e.g.. with customers, suppliers, distributors)
	The Enterprise Systems used in the business unit help us generally increase capacity (i.e., prepare to handle a greater volume of business) before our competitors do the same

Table A 7 Analysis Construct under ERP Strategy and Related Questions

Construct	Questions: In your opinion, please indicate the extent to which you agree with the statements as it relates to Enterprise Systems in your business.
Analysis – ERP Strategy	The Enterprise Systems used in the business unit represent investments geared at providing us with a future competitive edge
	The Enterprise Systems used in the business unit provide us with the facts and figures we need to support our day-to-day decision making
	The Enterprise Systems used in the business unit enable us to develop detailed analyses of our present business situation
	The Enterprise Systems used in the business unit allow us to emphasize our long-term business effectiveness through performance
	The Enterprise Systems used in the business unit enable us to carry out detailed analysis of major business decisions

Table A 8 Aggressiveness Construct under ERP Strategy and Related Questions

Construct	Questions: In your opinion, please indicate the extent to which you agree with the statements as it relates to Enterprise Systems in your business.
Aggressiveness – ERP Strategy	The Enterprise Systems used in the business unit help us monitor changes in our market share
	The Enterprise Systems used in the business unit help us expand our operations even when our cash flow is low
	The Enterprise Systems used in the business unit assist us in setting our prices relative to the competition

Table A 9 Risk Aversion Construct under ERP Strategy and Related Questions

Construct	Questions: In your opinion, please indicate the extent to which you agree with the statements as it relates to Enterprise Systems in your business.
Risk Aversion – ERP Strategy	The Enterprise Systems used in the business unit provide sufficiently detailed information to support conservative decision making
	The Enterprise Systems used in the business unit provide us with the data we need to steer clear of risky business propositions
	The Enterprise Systems used in the business unit give us the information we need in order to minimize business risks

Table A 10 Futurity Construct under ERP Strategy and Related Questions

Construct	Questions: In your opinion, please indicate which contexts (model, techniques, and systems) are used in your business operations.
Futurity – ERP Strategy	Forecasting of key indicators of business operations
	Studies of external technological developments (e.g., newly available materials, computer equipment)
	Systems for strategic business planning

Table A 11 Relative Financial Performance Construct and Related Questions

Construct	Questions: In your opinion, please indicate the extent that represents your business position relative to major competitors, in last 3 years.
Relative Financial Performance	Revenue growth
	Financial liquidity
	Market share gains
	Net profits
	Return on investment
	Overall performance

Table A 12 Absolute Financial Performance Construct and Related Questions

Construct	Questions: In your opinion, please indicate to what extent you are satisfied with each of followings statements about your business achievement, in last three years.
Absolute Financial Performance	Cash Flow
	Net Profits
	Return on Sales
	Return on Investment

Table A 13 Production-Service Innovation Construct and Related Questions

Construct	Questions: In your opinion, please indicate the extent that represents your business position relative to major competitors, in last 3 years. In your opinion, please indicate to what extent you are satisfied with each of followings statements about your business achievement, in last three years.
Production-Service Innovation	New Product and Service Development
	Technological developments and/or other innovations in business operations
	Frequency of new product or service introduction

Table A 14 Strategic ERP Flexibility Construct and Related Questions

Construct	Questions
Strategic ERP Flexibility	The Enterprise Systems used in the business unit assist in the identification of new business opportunities
	The Enterprise Systems used in the business unit help us rapidly adjust (e.g., recalculate) our prices
	The Enterprise Systems used in the business unit help us introduce new products and services in our market(s)
	The Enterprise Systems used in the business unit allow us to keep track of our competitors in order to preempt them if necessary
	The Enterprise Systems used in the business unit assist us in identifying operations in the later stages of their life cycles which should be strategically eliminated (e.g., divested)
	The Enterprise Systems used in the business unit help us generate innovative solutions for business problems
	The Enterprise Systems used in the business unit give us the information we need to grasp opportunities that come our way

Table A 15 Operational Construct and Related Questions

Construct	Questions
Operational	The Enterprise Systems used in the business unit support effective coordination among functions (e.g., finance and marketing) and product lines
	The Enterprise Systems used in the business unit provide sufficiently detailed information to support conservative decision making
	The Enterprise Systems used in the business unit provide us with the facts and figures we need to support our day-to-day decision making
	The Enterprise Systems used in the business unit enable us to develop detailed analyses of our present business situation
	The Enterprise Systems used in the business unit improve the efficiency of our business operations
	The Enterprise Systems used in the business unit help us maximize the efficiency of our business operations

Table A 16 Managerial Construct and Related Questions

Construct	Questions
Managerial	The Enterprise Systems used in the business unit enable us to monitor projects on a stage-by-stage basis
	The Enterprise Systems used in the business unit help us expand our operations even when our cash flow is low
	The Enterprise Systems used in the business unit employ innovative, leading edge technologies
	The Enterprise Systems used in the business unit help us aggressively go after market share
	The Enterprise Systems used in the business unit are creative and original

Table A 17 Market Information Construct and Related Questions

Construct	Questions
Market Information	The Enterprise Systems used in the business unit help us be (or become) one of the top firms in our market (or markets)
	The Enterprise Systems used in the business unit represent investments geared at providing us with a future competitive edge
	The Enterprise Systems used in the business unit assist us in setting our prices relative to the competition
	The Enterprise Systems used in the business unit give us the information we need in order to minimize business risks
	The Enterprise Systems used in the business unit provide us with information to defend our market position
	The Enterprise Systems used in the business unit help us monitor changes in our market share

Table A 18 Strategic Decision Support Construct and Related Questions

Construct	Questions
Strategic Decision Support	Forecasting of key indicators of business operations
	Studies of external technological developments (e.g., newly available materials, computer equipment)
	Systems for strategic business planning

Appendix B. Types of Fit and their Verbalization

Table B 1 Types of Fit and their Sample Verbalizations (modified based on Bergeron et al. 2001)

Type	Verbalization
Profile Deviation	The degree of adherence of proactiveness to strategic decision support has a significant effect on performance.
Matching	Fit in strategy context exists when business strategy matches enterprise systems strategy and improves performance.
Covariation	It is the appropriate coalignment of enterprise system strategy and business strategy which will influence performance.
Mediation	IT flexibility is an intervening variable between business strategy, enterprise system strategy, and firm performance.
Moderation	The interaction effects of enterprise systems strategy and business strategy will have impacts on firm performance.
Gestalt	Cluster of items.

Appendix C. Path Coefficients – Analytical Approach

Alternative view for calculation of alignment as profile deviation is to use a portion of the sample as the ideal profile (Bergeron et al. 1999; Venkatraman & Prescott, 1990; Drazin & Van de Ven, 1985). In order to calculate the ideal profile, 10% of our sample has been used as calibration sample. In order to calculate the ideal profile empirically (alternative to theoretical and the recommended method), 5 of top performers have been removed from the sample in order to be used as the calibration sample. In addition, 5 of the least performers have been removed from the sample in order to prevent the skewness of the data. The rest of the data has been used to measure the misfit, therefore fit, through Euclidean distance formula. Table represents the results of PLS analysis conducted with the new data where alignment as profile deviation has been calculated through empirical method.

Table C 1 Path Coefficients and Significance Levels among Constructs on Profile Deviation with Analytical Model with System and Bivariate Approaches for Alignment, Performance, and Strategic ERP Flexibility

Approach	Alignment Type	Construct	Relational Construct		R^2	Model Fit		
			Alignment	Flexibility		APC	ARS	AVIF
Systems	Profile Deviation (Analytical Approach)	Alignment	-	0.69**	0.47	0.294**	0.253**	1.591
		Performance	0.16 / NS	0.04 / NS	0.03			
Bivariate		Alignment	-	-	-	0.222 / NS	0.054 / NS	1.000
		Perf1	0.19 / NS	-	0.04			
		Perf2	0.16 / NS	-	0.02			
		Perf3	0.32**	-	0.10			
		Alignment	-	0.69**	0.47	0.168**	0.179 / NS	1.168
		Perf1	0.18 / NS	-0.23*	0.09			
		Perf2	0.16 / NS	-0.01 / NS	0.02			
		Perf3	0.20*	0.20***	0.13			

Appendix D. Sobel Tests for Alignment as Matching

Systems Approach – Matching1 Alignment – Sobel Test

Table D 1 Sobel Test of Mediation for Alignment as Matching (Matching 1) with Systems Approach

Relationship						
Independent	**Dependent**	**Control**	**Coefficient**	**S.E.**	**t value**	**Significance**
Flexibility	Performance	None	*0.1626*	*0.0714*	*2.2778*	*0.02*
Flexibility	Alignment	None	*0.7281*	*0.0818*	*8.8982*	*0.00*
Alignment	Performance	Flexibility	*0.1714*	*0.0907*	*1.8897*	*0.06*
Flexibility	Performance	Alignment	*0.0378*	*0.0965*	*0. 3921*	*0.69*

Table D 2 Alternative Measurements of Mediation Effect for Alignment as Matching (Matching 1) with Systems Approach

Independent Variable	Dependent Variable	Input Variable	Input Value	Test Type	T Stat.	Std. Error	P Value
Flexibility	Alignment (Match1)	Coefficient	0.728	Sobel Test	2.81631564	0.05066478	0.00485779
		Std. Error	0.082				
				Aroian Test	2.80038412	0.05095301	0.00510418
Alignment	Performance	Coefficient	0.196				
		Std. Error	0.066	Goodman Test	2.8325222	0.05037489	0.00461824

Systems Approach – Matching2 Alignment – Sobel Test

Table D 3 Sobel Test of Mediation for Alignment as Matching (Matching 2) with Systems Approach

Relationship						
Independent	**Dependent**	**Control**	**Coefficient**	**S.E.**	**t value**	**Significance**
Flexibility	Performance	None	*0.1626*	*0.0714*	*2.2778*	*0.02*
Flexibility	Alignment	None	*0.3178*	*0.1035*	*3.0702*	*0.00*
Alignment	Performance	Flexibility	*0.1246*	*0.0719*	*1.7330*	*0.08*
Flexibility	Performance	Alignment	*0.1230*	*0.0742*	*1.6575*	*0.10*

Table D 4 Alternative Measurements of Mediation Effect for Alignment as Matching (Matching 2) with Systems Approach

Independent Variable	Dependent Variable	Input Variable	Input Value	Test Type	T Stat.	Std. Error	P Value
Flexibility	Alignment (Match2)	Coefficient	0.318	Sobel Test	1.85493559	0.02760096	0.06360542
		Std. Error	0.104				
				Aroian Test	1.79525236	0.02851855	0.0726135
Alignment	Performance	Coefficient	0.161				
		Std. Error	0.069	Goodman Test	1.92099666	0.02665179	0.05473213

Systems Approach – Matching3 Alignment – Sobel Test

Table D 5 Sobel Test of Mediation for Alignment as Matching (Matching 3) with Systems Approach

Relationship						
Independent	**Dependent**	**Control**	**Coefficient**	**S.E.**	**t value**	**Significance**
Flexibility	Performance	None	*0.1626*	*0.0714*	*2.2778*	*0.02*
Flexibility	Alignment	None	*-2.5043*	*0.6195*	*-4.0425*	*0.00*
Alignment	Performance	Flexibility	*-0.0091*	*0.0122*	*-0.7445*	*0.46*
Flexibility	Performance	Alignment	*0.1399*	*0.0778*	*1.7984*	*0.07*

Table D 6 Alternative Measurements of Mediation Effect for Alignment as Matching (Matching 3) with Systems Approach

Independent Variable	Dependent Variable	Input Variable	Input Value	Test Type	T Stat.	Std. Error	P Value
Flexibility	Alignment (Match3)	Coefficient	-2.504	Sobel Test	1.51695154	0.02971222	0.12927892
		Std. Error	0.619				
				Aroian Test	1.47862224	0.03048243	0.13924131
Alignment	Performance	Coefficient	-0.018				
		Std. Error	0.011	Goodman Test	1.55842497	0.02892151	0.11913254

Systems Approach – Matching4 Alignment – Sobel Test

Table D 7 Sobel Test of Mediation for Alignment as Matching (Matching 4) with Systems Approach

Relationship						
Independent	**Dependent**	**Control**	**Coefficient**	**S.E.**	**t value**	**Significance**
Flexibility	Performance	None	*0.1626*	*0.0714*	*2.2778*	*0.02*
Flexibility	Alignment	None	*15.7598*	*1.2875*	*12.2407*	*0.00*
Alignment	Performance	Flexibility	*0.0129*	*0.0057*	*2.2558*	*0.026*
Flexibility	Performance	Alignment	*-0.0406*	*0.1140*	*-0.3564*	*0.72*

Table D 8 Alternative Measurements of Mediation Effect for Alignment as Matching (Matching 4) with Systems Approach

Independent Variable	Dependent Variable	Input Variable	Input Value	Test Type	T Stat.	Std. Error	P Value
Flexibility	Alignment (Match4)	Coefficient	15.760	Sobel Test	3.51258132	0.04935402	0.00044378
		Std. Error	1.287				
				Aroian Test	3.50188183	0.04950481	0.00046198
Alignment	Performance	Coefficient	0.011				
		Std. Error	0.003	Goodman Test	3.52337948	0.04920276	0.00042608

Appendix E. Bivariate Correlations

Table E 1 Bivariate Correlations among Performance and Alignment Types

Constructs	Perf1	Perf2	Perf3	Perf	Flexibility	ModAlg	PDAlg	Mat1Alg	Mat2Alg	Mat3Alg	Mat4Alg
Perf1											
Perf2	.391**										
Perf3	.209*	.215*									
Perf	.733**	.778**	.637**								
Flexibility	.083	.151	.275**	.233*							
ModAlg	.136	.215*	.312**	.306**	.784**						
PDAlg	.101	.168	.229*	.231*	.709**	.714**					
Mat1Alg	.184	.206*	.258*	.299**	.684**	.901**	.600**				
Mat2Alg	.133	.132	.260*	.239*	.308**	.720**	.303**	.729**			
Mat3Alg	.008	-.133	-.223*	-.162	-.392**	-.456**	-.452**	-.065	-.176		
Mat4Alg	.144	.232*	.323**	.323**	.790**	.995**	.723**	.894**	.698**	-.472**	

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*
Perf1: Absolute Financial Performance
Perf2: Relative Financial Performance
Perf3: Product-Service Innovation
Perf: Business Performance
Flexibility: Strategic ERP Flexibility
ModAlg: Alignment as Moderation
PDAlg: Alignment as Profile Deviation
Mat1Alg: Fit as Matching with Absolute Difference
Mat2Alg: Fit as Matching with Signed Difference
Mat3Alg: Fit as Matching with Squared, Summed Difference
Mat4Alg: Fit as Matching with Summed Interaction

Table E 2 Correlations among Alignment, Bivariate Performance, Flexibility, and Bivariate Alignment of Matching Components

Constructs	Perf1	Perf2	Perf3	Perf	Flexibility
Mat1Align	.184	.206*	.258*	.299**	.693**
Mat2Align	.133	.132	.260*	.239*	.298**
Mat3Align	.008	-.133	-.223*	-.162	-.424**
Mat4Align	.144	.232*	.323**	.323**	.811**
Flexibility	.067	.174	.275**	.239*	1

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*
Perf1: Absolute Financial Performance
Perf2: Relative Financial Performance
Perf3: Product-Service Innovation
Perf: Business Performance
Flexibility: Strategic ERP Flexibility
Mat1Align: Fit as Matching with Absolute Difference
Mat2Align: Fit as Matching with Signed Difference
Mat3Align: Fit as Matching with Squared, Summed Difference
Mat4Align: Fit as Matching with Summed Interaction

The following two tables show us the relationships among the bivariate alignment type (as moderation) and performance measurement. These tables are considered as part of the analysis since the real measurement is the alignment as moderation (algnmod) for our analysis. In order to interpret these tables, readers must assume that the smallest finding of alignment belongs to the individual alignment based on the business strategy. For example, if the alignment value for an organization is smallest for aggressiveness, the value for alignment would be one minus the Euclidian distance of that company. Therefore, since we consider it as the smallest value in this example, reader can interpret the findings as: there is a positive and significant correlation between alignment (as aggressiveness) and flexibility (0.577 and $p<0.01$). However, the relationship between alignment (as aggressiveness) and performance is nonsignificant.

Table E 3 Bivariate Correlations among Alignment, Performance, Flexibility, and Bivariate Alignment Components

Constructs	modalgndef	modalgnan	modalgnagg	modalgnrisk	modalgnfutr	algnmod	perf	flex
modalgndef								
modalgnan	.661**							
modalgnagg	.598**	.495**						
modalgnrisk	.193	.397**	.120					
modalgnfutr	.318**	.560**	.397**	.132				
algnmod	.757**	.876**	.711**	.481**	.731**			
perf	.242*	.464**	.084	.089	.188	.306**		
flex	.697**	.686**	.577**	.337**	.514**	.784**	.233*	

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*
modalgndef: Alignment as Moderation from Defensiveness Perspective (Bivariate Approach)
modalgnan: Alignment as Moderation from Analysis Perspective (Bivariate Approach)
modalgnagg: Alignment as Moderation from Aggressiveness Perspective (Bivariate Approach)
modalgnrisk: Alignment as Moderation from Risk Aversion Perspective (Bivariate Approach)
modalgnfutr: Alignment as Moderation from Futurity Perspective (Bivariate Approach)
algnmod: Alignment as Moderation (Systems Approach)
perf: Business Performance
flex: Strategic ERP Flexibility

Table E 4 Bivariate Correlations among Alignment, Bivariate Performance, Flexibility, and Bivariate Alignment (Moderation) Components

Constructs	**Perf1**	**Perf2**	**Perf3**	**Perf**	**Flexibility**
modalgndef	.065	.211*	.242*	.242*	.697**
modalgnan	.243*	.334**	.426**	.464**	.686**
modalgnagg	-.110	.029	.270**	.084	.577**
modalgnrisk	.101	.127	-.048	.089	.337**
modalgnfutr	.143	.072	.202	.188	.514**
algnmod	.136	.215*	.312**	.306**	.784**

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*
modalgndef: Alignment as Moderation from Defensiveness Perspective (Bivariate Approach)
modalgnan: Alignment as Moderation from Analysis Perspective (Bivariate Approach)
modalgnagg: Alignment as Moderation from Aggressiveness Perspective (Bivariate Approach)
modalgnrisk: Alignment as Moderation from Risk Aversion Perspective (Bivariate Approach)
modalgnfutr: Alignment as Moderation from Futurity Perspective (Bivariate Approach)
algnmod: Alignment as Moderation (Systems Approach)
Perf1: Absolute Financial Performance
Perf2: Relative Financial Performance
Perf3: Product-Service Innovation
perf: Business Performance
Flexibility: Strategic ERP Flexibility

Table E 5 Bivariate Correlations among Alignment, Bivariate Performance, Flexibility, and Bivariate Alignment (Profile Deviation) Components

Constructs	Perf1	Perf2	Perf3	Perf	Flexibility
PDAlign	.101	.168	.229*	.231*	.736**
pdpros	.120	.056	.145	.144	.582**
pddiff	.147	.166	.241*	.255*	.820**
pdanaly	.153	.217*	.268**	.295**	.889**
pdcost	.179	.240*	.250*	.311**	.827**
pddef	.200	.257*	.208*	.311	.660**
Flexibility	.067	.174	.275**	.239*	1

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

modalgndef: Alignment as Moderation from Defensiveness Perspective (Bivariate Approach)
modalgnan: Alignment as Moderation from Analysis Perspective (Bivariate Approach)
modalgnagg: Alignment as Moderation from Aggressiveness Perspective (Bivariate Approach)
modalgnrisk: Alignment as Moderation from Risk Aversion Perspective (Bivariate Approach)
modalgnfutr: Alignment as Moderation from Futurity Perspective (Bivariate Approach)
algnmod: Alignment as Moderation (Systems Approach)
Perf1: Absolute Financial Performance
Perf2: Relative Financial Performance
Perf3: Product-Service Innovation
perf: Business Performance
Flexibility: Strategic ERP Flexibility

Appendix F. Regression Analysis

Table F 1 Regression Analysis between Alignment, and Performance

Independent Variable	Dependent Variable	R Square	F Stats	Sig.	Standard. Coefficient	Model	T Value	Sig.
Flexibility	Performance	0.055	5.188	0.025	0.233	*Constant*	13.590	.000
						DV	2.278	.025
AlgPros	Performance	0.021	1.917	0.170	0.144	*Constant*	18.947	.000
						DV	1.385	.170
AlgDiff	Performance	0.065	6.271	0.014	0.255	*Constant*	29.074	.000
						DV	2.504	.014
AlgAnaly	Performance	0.087	8.604	0.004	0.295	*Constant*	28.523	.000
						DV	2.933	.004
AlgCost	Performance	0.097	9.640	0.003	0.311	*Constant*	31.564	.000
						DV	3.105	.003
AlgDefe	Performance	0.096	9.606	0.003	0.311	*Constant*	19.390	.000
						DV	3.099	.003

Notes:

Flexibility: Strategic ERP Flexibility
AlgPros: Alignment as Profile Deviation with Prospector Profile
AlgDiff: Alignment as Profile Deviation with Differentiator Profile
AlgAnaly: Alignment as Profile Deviation with Analyzer Profile
AlgCost: Alignment as Profile Deviation with Cost Leader Profile
AlgDefe: Alignment as Profile Deviation with Defensive Profile

Appendix G. ANOVA Results

Table G 1 ANOVA Results for Alignment as Matching and Performance Based on Flexibility Level

Independent Variable	Dependent Variable	R Square	F Stats	Sig.	Standard. Coefficient	Model	T Value	Sig.
Alignment (Matching 1)	Performance	0.089	8.837	0.004	0.299	Constant	3.827	.000
						IV	2.973	.004
Alignment (Matching 2)	Performance	0.057	5.454	0.022	0.239	Constant	4.766	.000
						IV	2.335	.022
Alignment (Matching 3)	Performance	0.026	2.422	0.123	-0.162	Constant	39.938	.000
						IV	-1.556	.123
Alignment (Matching 4)	Performance	0.104	10.487	0.002	0.323	Constant	13.323	.000
						IV	3.238	.002

Notes:

Matching1: Fit as Matching with Absolute Difference
Matching2: Fit as Matching with Signed Difference
Matching3: Fit as Matching with Squared, Summed Difference
Matching4: Fit as Matching with Summed Interaction

Table G 2 ANOVA Results for Alignment as Matching based on Flexibility Level

Independent Variable	Dependent Variable	R Square	F Stats	Sig.	Standard. Coefficient	Model	T Value	Sig.
Flexibility	Alignment (Matching 1)	0.480	83.218	0.000	0.693	Constant	20.496	.000
						IV	9.122	.000
Flexibility	Alignment (Matching 2)	0.089	8.751	0.004	0.298	Constant	17.942	.000
						IV	2.958	.004
Flexibility	Alignment (Matching 3)	0.180	19.721	0.000	-0.424	Constant	7.224	.000
						IV	-4.441	.000
Flexibility	Alignment (Matching 4)	0.657	172.358	0.000	0.811	Constant	1.833	.070
						IV	13.129	.000

Notes:

Matching1: Fit as Matching with Absolute Difference
Matching2: Fit as Matching with Signed Difference
Matching3: Fit as Matching with Squared, Summed Difference
Matching4: Fit as Matching with Summed Interaction

Table G 3 ANOVA Results for Business Strategy Profiles Based on Flexibility

Alignment Type	Individual Alignment	Mean	Standard Deviation	Mean Squares	F Value	Sig.
Profile Deviation	Prospectors	-1.015	0.330	0.069	27.406	.000
	Differentiation	-0.864	0.448	0.085	62.906	.000
	Analysis	-1.096	0.533	0.109	74.330	.000
	Cost Leaders	-0.887	0.491	0.112	53.810	.000
	Defender	-1.299	0.373	0.093	24.080	.000

Table G 4 ANOVA Results for Alignment Types Based on Flexibility

Independent Variable	Dependent Variable	Mean	Standard Deviation	Mean Squares	F Value	Sig.
Flexibility	A.Moderation	17.805	4.135	8.237	49.949	.000
	A.Prof. Devait.	-0.971	0.502	0.144	35.394	.000
	A.Mathcing 1	7.439	0.858	0.430	33.551	.000
	A.Matching 2	6.781	0.833	0.614	6.851	.002
	A.Matching 3	5.608	5.153	20.524	14.359	.000
	A.Matching 4	56.111	16.083	124.589	49.959	.000

Notes:

A.Moderation: Alignment as Moderation
A.Prof.Devait.: Alignment as Profile Deviation
A.Mathcing1: Fit as Matching with Absolute Difference
A.Matching2: Fit as Matching with Signed Difference
A.Matching3: Fit as Matching with Squared, Summed Difference
A.Matching4: Fit as Matching with Summed Interaction

Post Hoc analyses reveal that means of all main and sub alignment types are significantly different than each other for the different levels of flexibility. The results also reveal that all the means (except only alignment as matching 2 for level 2 and level 3; and alignment as matching 3 for level 2 and level 1) of variables increase as the level of flexibility increases.

Appendix H. Individual PLS Analysis

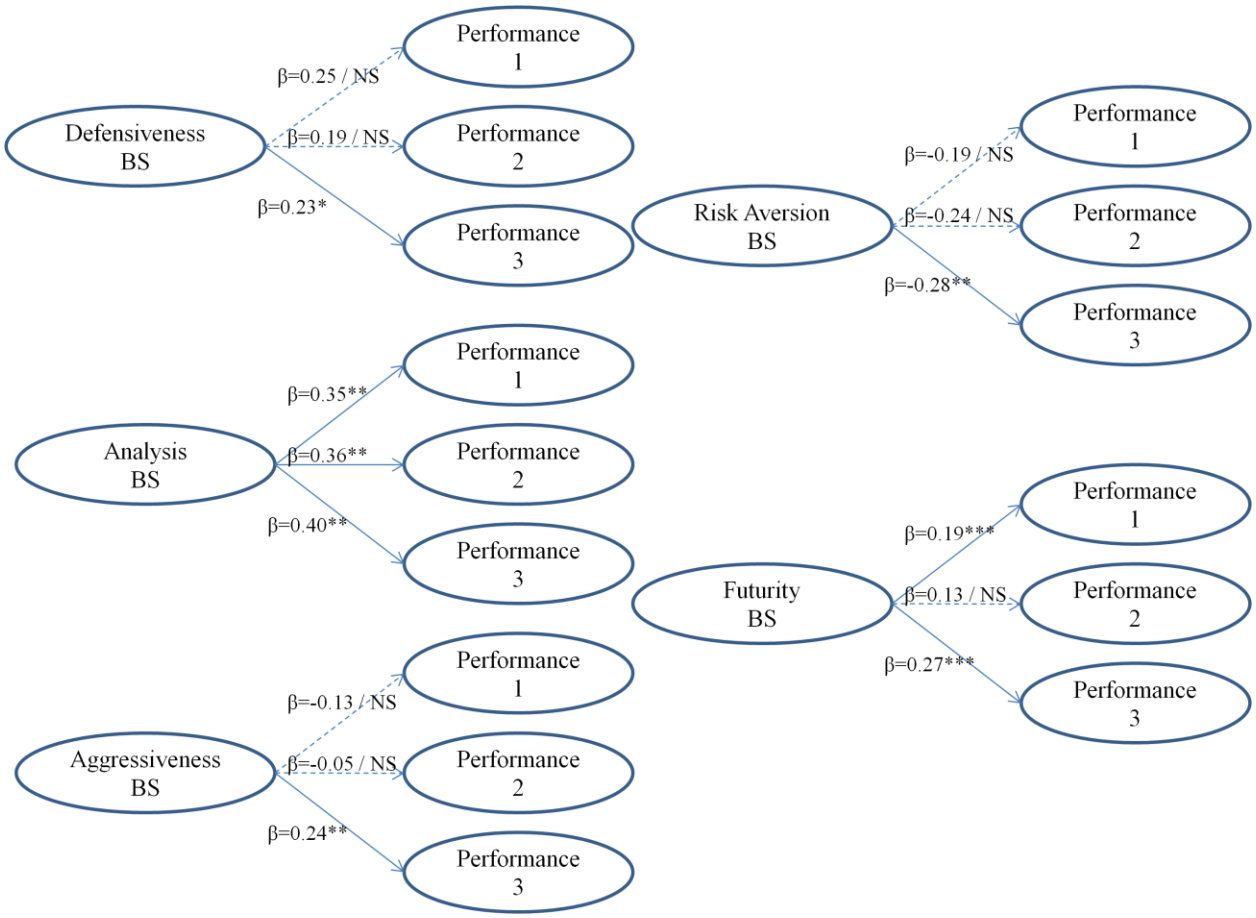

Figure H 1 Bivariate Approach for Business Strategy Types and Performance

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
Defensiveness BS: Business Strategy Attribute of Defensiveness
Analysis BS: Business Strategy Attribute of Analysis
Aggressiveness BS: Business Strategy Attribute of Aggressiveness
Risk Aversion BS: Business Strategy Attribute of Risk Aversion
Futurity BS: Business Strategy Attribute of Futurity
Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

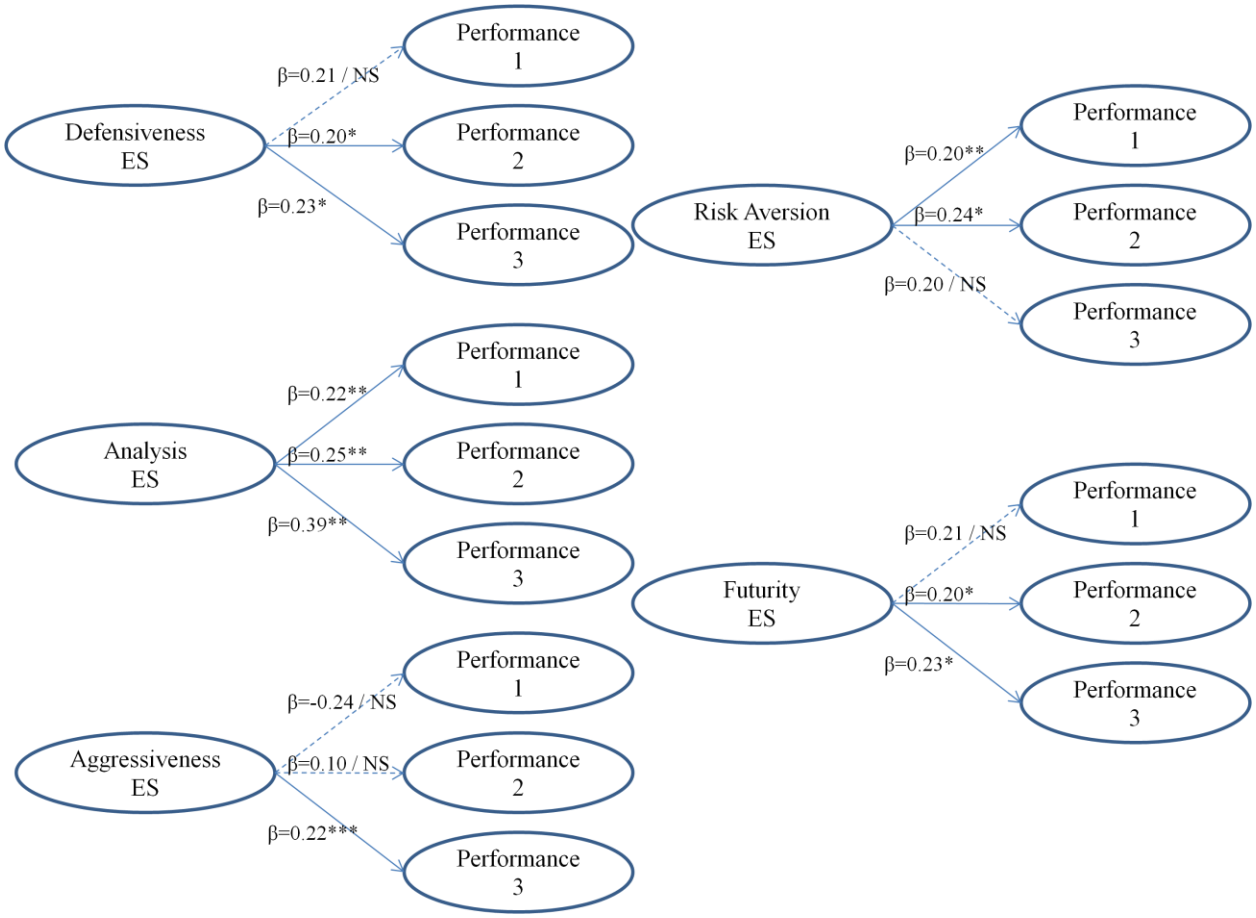

Figure H 2 Bivariate Approach for ERP Strategy Types and Performance

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
Defensiveness ES: ERP Strategy Attribute of Defensiveness
Analysis ES: ERP Strategy Attribute of Analysis
Aggressiveness ES: ERP Strategy Attribute of Aggressiveness
Risk Aversion ES: ERP Strategy Attribute of Risk Aversion
Futurity ES: ERP Strategy Attribute of Futurity
Performance1: Absolute Financial Performance
Performance2: Relative Financial Performance
Performance3: Product-Service Innovation

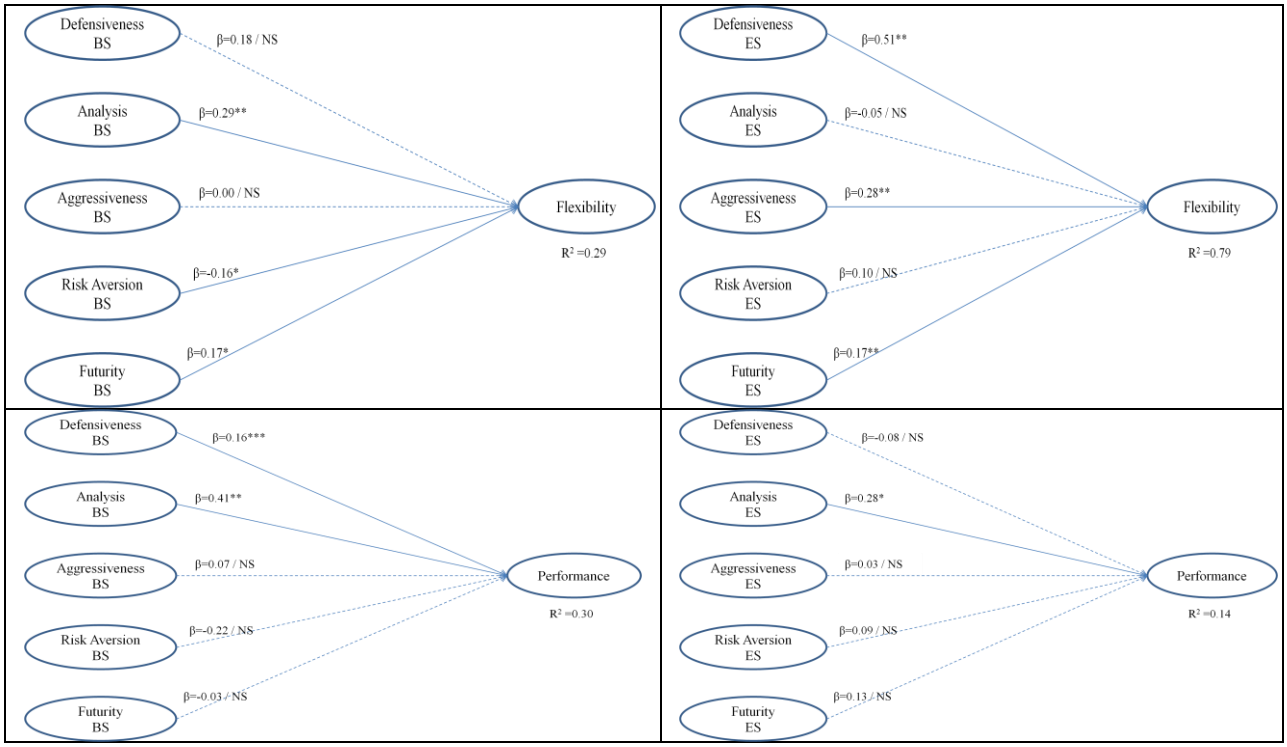

Figure H 3 Bivariate Approach for Business and ES Strategy Types, Performance, and Flexibility

Notes:

**: Correlation is significant at the 0.05 level (2 tailed)*
***: Correlation is significant at the 0.01 level (2 tailed)*
NS: Not Significant
β: Path Coefficient
Defensiveness ES: ERP Strategy Attribute of Defensiveness
Analysis ES: ERP Strategy Attribute of Analysis
Aggressiveness ES: ERP Strategy Attribute of Aggressiveness
Risk Aversion ES: ERP Strategy Attribute of Risk Aversion
Futurity ES: ERP Strategy Attribute of Futurity
Defensiveness BS: Business Strategy Attribute of Defensiveness
Analysis BS: Business Strategy Attribute of Analysis
Aggressiveness BS: Business Strategy Attribute of Aggressiveness
Risk Aversion BS: Business Strategy Attribute of Risk Aversion
Futurity BS: Business Strategy Attribute of Futurity
Performance: Business Performance
Flexibility: Strategic ERP Flexibility

Appendix I. Alignment as Matching, Bivariate Approach

Table I 1 Path Coefficients and Significance Levels among Constructs on Moderation, Profile Deviation, Matching Type of Alignment with Systems Approach for Alignment, and Performance

Approach	Alignment Type		Construct	Relational Construct	Model Fit		
				Performance	APC	ARS	AVIF
Systems	Moderation		Alignment	0.30**	0.298**	0.089*	1.000
	Profile Deviation			0.34**	0.343**	0.118*	1.000
	Matching	Match1		0.30**	0.300**	0.090*	1.000
		Match2		0.25**	0.245**	0.060***	1.000
		Match3		-0.20 / NS	-0.199 / NS	0.040***	1.000
		Match4		0.32**	0.320**	0.103*	1.000

Table I 2 Path Coefficients and Significance Levels among Constructs on Moderation, Profile Deviation, Matching Type of Alignment with Bivariate Approach for Alignment, and Performance

Approach	Alignment Type		Construct	Relational Construct			Model Fit		
				Perf1	Perf2	Perf3	APC	ARS	AVIF
Bivariate	Moderation		Alignment	0.17 / NS	0.22*	0.32**	0.235**	0.059 / NS	1.000
	Profile Deviation			0.25 / NS	0.35***	0.26**	0.236**	0.083 / NS	1.000
	Matching	*Match1*		*0.22**	*0.21**	*0.26**	*0.231***	*0.054 / NS*	*1.000*
		Match2		*0.18**	*0.15**	*0.29***	*0.209***	*0.047 / NS*	*1.000*
		Match3		*0.16 / NS*	*-0.27 / NS*	*-0.27***	*-0.126 / NS*	*0.057 / NS*	*1.000*
		Match4		*0.19***	*0.24**	*0.33***	*0.252***	*0.067 / NS*	*1.000*

Notes:

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*
NS: Not Significant
Match1: Fit as Matching with Absolute Difference
Match2: Fit as Matching with Signed Difference
Match3: Fit as Matching with Squared, Summed Difference
Match4: Fit as Matching with Summed Interaction
APC: Average Path Coefficient
ARS: Average R-Square
AVIF: Average Variance Inflation Factor

Appendix J. E-mail to Join the Research

Dear Sir/Madam:

We are writing to ask for your help in a study under University of British Columbia, Okanagan, pertaining Alignment of Business Strategies and Enterprise Systems (ES) Strategies. This study is a doctoral dissertation and part of an effort to learn and understand the factors affecting this construct.

We are contacting a random sample of individuals from various organizations that are or have been involved in the development of organizational or information systems planning for ES (i.e., ERP, SCM, CRM, EMS, MRPs, etc.,) within their organizations. We would appreciate if you can complete this survey on-line at (http://people.ok.ubc.ca/jvervill). The survey is voluntary; however, if you wish to withdraw your completed questionnaire after submission, it would be impossible to do so since the survey questionnaire is anonymous (no individual or organization can be identified in any way).

Results from the survey will be disseminated to academic and practitioner audiences and knowledge of these factors would contribute to the growth of the field of Management of Information Systems. An understanding of these factors would provide a base line for research and curriculum development within our programs.

The survey should take about 20 minutes to complete, and your participation is vital to the success of this project.

All responses will remain confidential, and anonymity of individual(s) and/or organization(s) will be strictly adhered too. In other words, no individual or organization will be associated with specific questionnaires or answers.

If you have any questions or comments about this study, we would be happy to talk with you. Our telephone number is 1-250-807-9637, or you can email us at Jacques.Verville@ubc.ca or Nazim.Taskin@ubc.ca.

Thank you for helping with this important study.

Sincerely,

Jacques Verville, PhD
Associate Professor of Information Technology Management

Nazim Taskin, PhD Candidate
Interdisciplinary Graduate Studies, Faculty of Management

Appendix K. E-mail to Remind to Join the Research

Dear Sir or Madam:

Recognizing your very busy schedule, I'm sending you this e-mail as a reminder regarding the questionnaire survey that I sent two weeks ago. It is crucial for us to get as more responses as possible for the success of our project. We would appreciate if you could fill out the survey. If you have already filled out the survey, please ignore this message.

We are writing to ask for your help in a study under University of British Columbia, Okanagan, pertaining Alignment of Business Strategies and Enterprise Systems (ES) Strategies. This study is a doctoral dissertation and part of an effort to learn and understand the factors affecting this construct.

We are contacting a random sample of individuals from various organizations that are or have been involved in the development of organizational or information systems planning for ES (i.e., ERP, SCM, CRM, EMS, MRPs, etc.,) within their organizations. We would appreciate if you can complete this survey on-line at (http://people.ok.ubc.ca/jvervill). The survey is voluntary; however, if you wish to withdraw your completed questionnaire after submission, it would be impossible to do so since the survey questionnaire is anonymous (no individual or organization can be identified in any way).

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If you have any questions or comments about this study, we would be happy to talk with you. Our telephone number is 1-250-807-9637, or you can email us at Jacques.Verville@ubc.ca or Nazim.Taskin@ubc.ca.

Thank you for helping with this important study.

Sincerely,

Jacques Verville, PhD
Associate Professor of Information Technology Management

Nazim Taskin, PhD Candidate
Interdisciplinary Graduate Studies, Faculty of Management

Appendix L. Survey Instrument

THE UNIVERSITY OF BRITISH COLUMBIA

Faculty of Management
3333 University Way
Kelowna, BC Canada V1V 1V7
Tel: (250) 807-9501
Fax: (250) 807-8533
www.ubc.ca/okanagan/management

Dear Sir or Madam:

We are writing to ask for your help in a study pertaining Alignment of Business Strategies and Enterprise Systems (ES) Strategies. This study is part of an effort to learn and understand the factors affecting this construct.

We are contacting a random sample of individuals from various organizations that are or have been involved in the development of organizational or information systems planning for ES (i.e., ERP, SCM, CRM, EMS, MRPs, etc.,) within their organizations. We would appreciate your responding to as many questions as possible and then returning the document in the attached envelope. If preferable, you can complete this survey on-line at (http://people.ok.ubc.ca/jvervill). This survey is voluntary; however, if you wish to withdraw your completed questionnaire after submission, it would be impossible to do so since the survey questionnaire is anonymous (no individual or organization can be identified in any way).

Results from the survey will be disseminated to academic and practitioner audiences and knowledge of these factors would contribute to the growth of the field of Management of Information Systems. An understanding of these factors would provide a base line for research and curriculum development within our programs.

The attached survey should take about 20 minutes to complete, and your participation is vital to the success of this project. Please answer as many questions as you can, then enclose it in the attached return envelope.

All responses will remain confidential, and anonymity of individual(s) and/or organization(s) will be strictly adhered too. In other words, no individual or organization will be associated with specific questionnaires or answers.

If you have any questions or comments about this study, we would be happy to talk with you. Our telephone number is 1-250-807-9637, or you can email us at Jacques.Verville@ubc.ca or Nazim.Taskin@ubc.ca.

Thank you for helping with this important study.
Sincerely,
Jacques Verville, PhD
Associate Professor of Information Technology Management

Nazim Taskin, PhD Candidate
Interdisciplinary Graduate Studies, Faculty of Management

Alignment of Business Strategies and Enterprise Systems Strategies

This research project examines the alignment between Business Strategies and Enterprise Systems (ES) strategies. It focuses on: (1) Business Strategic orientation; (2) ES strategic orientation; (3) antecedents of alignment; and (4) business performance.

I-In your opinion, please indicate the extent to which you agree with the following statements as it relates to your business.

1) Strongly Disagree; 5) Strongly Agree; N/A) Non Applicable or Do Not Know

1. We regularly seek to identify new business opportunities
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

2. We secure our present market position prior to seeking new markets
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

3. In general, our mode of operations is riskier than our competitors
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

4. We are usually the first ones to introduce new products and services in our market (or markets)
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

5. We sacrifice short-term profitability to gain market share
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

6. We optimize coordination among functions (e.g., finance and marketing)
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

7. We frequently use price cutting to increase our market share
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

8. Our criteria for budget allocations generally reflect short-term considerations
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

9. We strive to be one of the top three firms in each of our markets
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

10. We carry out long-term research to provide us with a future competitive edge
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

11. We adopt a rather conservative view when making major decisions
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

12. We develop strong relationships with our major customers
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

13. We develop strong relationships with our suppliers (e.g., providers of key services, materials, finance)
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

14. We develop innovative solutions for most business problems
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

15. We require a great deal of factual information to support our day-to-day decision making
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

16. When confronted with major decisions, we typically develop comprehensive analysis of the business situations faced
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

17. We regularly are on the lookout for businesses or business units to acquire
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

18. We generally expand capacity ahead of our competitors
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

19. We strategically eliminate (e.g., divest) operations in the later stages of their life cycles
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

20. Our strategic orientation includes/requires approval of new projects on a stage-by-stage basis rather than with blanket approval
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

21. Our strategic orientation includes/requires a constant drive to improve operating efficiency
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

22. Our strategic orientation includes/requires business operations generally following 'tried and true' paths
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

23. Our strategic orientation includes/requires market share positions sought at the expense of cash-flow
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

24. Our strategic orientation includes/requires early adoption of innovations
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

25. Our strategic orientation includes/requires a considerable degree of bargaining power with respect to our customers
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

26. Our strategic orientation includes/requires a strong preference for setting prices below the competition
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

27. The performance measures reviewed by the senior management team emphasize our long-term business effectiveness
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

28. We tend to act aggressively in our marketplace
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

29. We tend to be risk-averse
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

30. We tend to be creative and original
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

31. We tend to be highly analytical in our decision-making
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

32. We tend to be future-oriented (i.e., more focused on the long term than on the short term)
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

33. We seem to be always exploring new business opportunities
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

34. We devote a great deal of attention to improving the efficiency of our business operations
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

35. We put a lot of emphasis on (e.g., invest in) building the relationships we have with major customers, suppliers (e.g., providers of key services, materials, finance), and distributors
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

36. We generally increase capacity (i.e., prepare to handle a greater volume of business) before our competitors do the same
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

II-In your opinion, please indicate which contexts (model, techniques, and systems) are used in the business operations.

1) Occasionally used; 5) Extensively used; N/A) Non Applicable or Do Not Know

37. Forecasting of key indicators of business operations
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

38. Studies of external technological developments (e.g., newly available materials, computer equipment)
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

39. Systems for strategic business planning
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

III-In your opinion, please indicate how important the following statements are for aligning (fit between) Enterprise System Strategies and Business Strategies in terms of the degree to which missions, objectives, decisions, and plans support or supported by.

1) Least Important; 5) Very Important; N/A) Non Applicable or Do Not Know

40. Managers are aware of the importance of Enterprise Systems and support and encourage their use
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

41. Change management procedures (documentation, approval, etc.) are implemented in our business unit
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

42. We reengineer business processes as the need arises
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

43. Training and education are valued and encouraged for our Enterprise Systems Strategies
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

44. We promote involvement of entire IS management in strategy planning
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

45. Effective communication between IS department and other business departments
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

46. Our business unit and Information Systems set clear visions and goals
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

47. Both IT management and Business have a mutual understanding
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

48. Sharing knowledge between departments is institutionalized or extra-enterprise
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

49. Our IS plans are connected to the general business plans of the department
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

50. Strategic goals can be achieved by utilizing IS
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

51. Ease of integration of business information and processes
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

52. Information Systems are governed from a central location
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

53. Our IS structure is flexible and it can be upgraded to handle our needs at a much higher scale
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

IV-In your opinion, please indicate to what extent you are satisfied with each of followings statements about your business achievement, in last three years.

1) Highly Dissatisfied; 5) Highly Satisfied; N/A) Non Applicable or Do Not Know

54. Market Share
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

55. Cash Flow
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

56. Sales Growth Rate
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

57. Net Profits
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

58. Return on Sales
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

59. Return on Investment
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

60. New Product and Service Development
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

61. Sales Growth position relative to our principal competitor
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

62. Return on corporate investment position relative to our principal competitors
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

V-In your opinion, please indicate the extent that represents your business position relative to major competitors, in last 3 years.

1) Much worse than the competitor; 5) Much better than the competitor; N/A) Non Applicable or Do Not Know

63. Revenue growth
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

64. Financial liquidity
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

65. Technological developments and/or other innovations in business operations
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

66. Product quality
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

67. Market share gains
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

68. Net profits
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

69. Return on investment
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

70. Frequency of new product or service introduction
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

71. Reputation among major customer segments
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

72. Overall performance
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

VI-In your opinion, please indicate the extent to which you agree with the statements as it relates to Enterprise Systems in your business.

1) Strongly Disagree; 5) Strongly Agree; N/A) Non Applicable of Do Not Know

73. The Enterprise Systems used in the business unit assist in the identification of new business opportunities
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

74. The Enterprise Systems used in the business unit provide us with information to defend our market position
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

75. The Enterprise Systems used in the business unit help us take calculated business risks
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

76. The Enterprise Systems used in the business unit help us monitor changes in our market share
○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

77. The Enterprise Systems used in the business unit support effective coordination among functions (e.g., finance and marketing) and product lines

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

78. The Enterprise Systems used in the business unit help us rapidly adjust (e.g., recalculate) our prices

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

79. The Enterprise Systems used in the business unit allow us to adjust budget allocation decisions based on short-term considerations

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

80. The Enterprise Systems used in the business unit help us be (or become) one of the top firms in our market (or markets)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

81. The Enterprise Systems used in the business unit represent investments geared at providing us with a future competitive edge

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

82. The Enterprise Systems used in the business unit help us introduce new products and services in our market(s)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

83. The Enterprise Systems used in the business unit help us identify companies we may be interested in acquiring

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

84. The Enterprise Systems used in the business unit provide sufficiently detailed information to support conservative decision making

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

85. The Enterprise Systems used in the business unit enable us to develop stronger ties with major customers

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

86. The Enterprise Systems used in the business unit enable us to develop stronger ties with major suppliers (e.g., providers of key services, materials, finance)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

87. The Enterprise Systems used in the business unit provide us with the facts and figures we need to support our day-to-day decision making

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

88. The Enterprise Systems used in the business unit enable us to develop detailed analyses of our present business situation

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

89. The Enterprise Systems used in the business unit allow us to keep track of our competitors in order to preempt them if necessary

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

90. The Enterprise Systems used in the business unit assist us in identifying operations in the later stages of their life cycles which should be strategically eliminated (e.g., divested)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

91. The Enterprise Systems used in the business unit enable us to monitor projects on a stage-by-stage basis

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

92. The Enterprise Systems used in the business unit improve the efficiency of our business operations

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

93. The Enterprise Systems used in the business unit help us generate innovative solutions for business problems

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

94. The Enterprise Systems used in the business unit provide us with the data we need to steer clear of risky business propositions

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

95. The Enterprise Systems used in the business unit help us expand our operations even when our cash flow is low

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

96. The Enterprise Systems used in the business unit employ innovative, leading edge technologies

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

97. The Enterprise Systems used in the business unit assist us in setting our prices relative to the competition

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

98. The Enterprise Systems used in the business unit provide us with a considerable degree of bargaining power with respect to our customers

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

99. The Enterprise Systems used in the business unit allow us to emphasize our long-term business effectiveness through performance

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

100. The Enterprise Systems used in the business unit help us aggressively go after market share

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

101. The Enterprise Systems used in the business unit give us the information we need in order to minimize business risks

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

102. The Enterprise Systems used in the business unit are creative and original

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

103. The Enterprise Systems used in the business unit enable us to carry out detailed analysis of major business decisions

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

104. The Enterprise Systems used in the business unit assist us more with long-term planning than with short-term planning

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

105. The Enterprise Systems used in the business unit give us the information we need to grasp opportunities that come our way

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

106. The Enterprise Systems used in the business unit help us maximize the efficiency of our business operations

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

107. The Enterprise Systems used in the business unit help us establish strong market links in general (e.g.. with customers, suppliers, distributors)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

108. The Enterprise Systems used in the business unit help us generally increase capacity (i.e., prepare to handle a greater volume of business) before our competitors do the same

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

VII-In your opinion, please indicate which contexts (model, techniques, and systems) are used in your business operations.

1) Occasionally used; 5) Extensively used; N/A) Non Applicable or Do Not Know

109. Forecasting of key indicators of business operations

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

110. Studies of external technological developments (e.g., newly available materials, computer equipment)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

111. Systems for strategic business planning

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

112. How would you describe your organization's use of technology? *(1) Laggard; 2) Somewhat behind; 3) Middle of the pack; 4) Close follower; 5) Industry leader; N/A) Non Applicable or Do Not Know)*

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ N/A

VIII-Demographics

113. What is your job title/area of responsibility?

☐ *1.CIO* ☐ *2. IT Management* ☐ *3.Purchasing*
☐ *4.Legal* ☐ *5. User* ☐ *6. Other*

114. If 'Other', please specify:

_____

115. What type Enterprise Systems are you using in your organization?

☐ *Enterprise Resource Planning (ERP)*
☐ *Supply Chain Management (SCM)*
☐ *Customer Relationship Management (CRM)*
☐ *Supplier Relationship Management (SRM)*
☐ *Advanced Planning and Scheduling (APS)*
☐ *Product Life Cycle Management (PLM)*
☐ *Sales Force Automation (SFA)*
☐ *Solution Manager*
☐ *Other*

116. If 'Other', please specify:

117. Please indicate the primary industry of your company:

_____

118. Number of employees in ENTIRE COMPANY:

☐ *1.Over 50,000* ☐ *2.20,000 – 49,999* ☐ *3.10,000 - 19,999*
☐ *4.5,000 - 9,999* ☐ *5.1,000 - 4,999* ☐ *6.500 – 999*
☐ *7.100 – 499* ☐ *8.Less than 100*

119. What is the approximate worldwide sales volume of your company (in US dollars)?

☐ *1.100,000,000 plus* ☐ *2.10,000,000 - 99,999,999*
☐ *3.1,000,000 – 9,999,999* ☐ *4.500,000 – 999,999*
☐ *5.Less than 500,000*

120. Number of years that Enterprise Systems have been used on a regular basis in your business unit:

☐ *1.Less than 1 Year* ☐ *2.1 - 3 Years* ☐ *3.4 - 6 Years*
☐ *4.7 - 10 years* ☐ *5.More than 10 years*

121. When was the last update or replacement of your system?

☐ *1.Less than 1 Year* ☐ *2.1 - 2 Years* ☐ *3.3 - 5 Years*
☐ *4.6 - 9 Years* ☐ *5.More than 9 years*

122. Comments: