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RESEARCH ARTICLE

An Empirical Study on Strategic Alignment of Enterprise Systems

Kurumsal Sistemlerin Stratejik Hizalanması Üzerine Ampirik Bir Çalışma

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ABSTRACT

This study examines the relationship between business strategy, ES strategy, strategic alignment of these strategies, flexibility and the business performance. The study examines alignment as a matching approach. A questionnaire survey was conducted to gather data from North American participants from service and manufacturing industries. The Partial Least Squares (PLS) method that is a Structured Equation Modeling (SEM) based statistical tool was used for analyzing the data. The study results show alignment has a significant and positive impact on performance. The alignment mediates the relationship between strategic flexibility of ERP and business performance. In order for ES to contribute to business value or performance, ES strategies need to be aligned with business strategies. The main limitations of this study include sample size (N=92) and possibly the nature of the data as the study uses cross-sectional data rather than a longitudinal study. The study results can help managers and practitioners to prioritize their ES plans and investments. The practitioner-oriented version of the instrument of this study and the methods can be used to continuously assess the organizations' realized business strategy instead of planned strategies, especially when there is a shift in the business environment.

Keywords: Enterprise Systems, Strategic Alignment, Strategic Flexibility, Performance, Enterprise Resource Planning

ÖZ

Bu çalışma, iş stratejisi, ES stratejisi, bu stratejilerin stratejik uyumu, esneklik ve iş performansı arasındaki ilişkiyi incelemektedir. Çalışma, eşleştirme yaklaşımı olarak hizalamayı incelemektedir. Çalışmada hizmet ve imalat endüstrilerinden Kuzey Amerikalı katılımcılardan veri toplamak için bir anket çalışması kullanılmıştır. Verilerin analizinde Yapılandırılmış Eşitlik Modelleme (SEM) tabanlı bir istatistiksel araç olan Kısmi En Küçük Kareler (PLS) yöntemi kullanılmıştır. Çalışma sonuçları, uyumun performans üzerinde önemli ve olumlu bir etkisi olduğunu göstermektedir. Hizalama, ERP'nin stratejik esnekliği ile iş performansı arasındaki ilişkiye aracılık eder. ES'nin iş değerine veya performansına katkıda bulunması için ES stratejilerinin iş stratejileriyle uyumlu olması gerekir. Bu çalışmanın ana sınırlamaları, örneklem büyüklüğünü (N=92) ve çalışma boylamsal bir çalışma yerine kesitsel verileri kullandığından muhtemelen verilerin çeşidini içerir. Çalışma sonuçları, yöneticilerin ve uygulayıcıların ES planlarına ve yatırımlarına öncelik vermelerine yardımcı olabilir. Bu çalışmanın aracının uygulayıcı odaklı versiyonu ve yöntemler, özellikle iş ortamında bir değişiklik olduğunda, kuruluşların planlanan strateji yerine gerçekleştirdiği iş stratejisini sürekli olarak değerlendirmek için kullanılabilir.

Anahtar Kelimeler: Kurumsal Sistemler, Stratejik Hizalama, Stratejik Esneklik, Performans, Kurumsal Kaynak Planlama

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1. Introduction

In today's business world, filled with continuous changes, intense competition and uncertainties, companies either adapt to new conditions or their businesses fail (Kirmizi & Kocaoglu, 2020). To respond to the changing environment and to remain competitive, organizations need to continuously improve their business practices, procedures and their outputs (Kirmizi & Kocaoglu, 2020; Umble, Haft, & Umble, 2003). Information Systems (IS) or Enterprise Systems (ES) technology for many organizations has provided the opportunity for organizations to improve the way they do business (Uysal & Cetinkaya, 2021). The role of ES has been evolving from automating information-based processes to enhancing management efficiency, and to improving competitive advantages (Malik & Khan, 2021; Ward & Peppard, 2002). Besides, many organizations use ES to collaborate with other organizations. Market pressure, technological developments, and other business trends have pushed organizations to collaborate more, thereby improving their business practices (Stefanou, 2001). Collaboration requires integrated systems for better sharing of resources as well as information with other relevant parties including customers, suppliers, and distributors (Umble et al., 2003).

Enterprise Resource Planning (ERP) systems, a further development of ES, enable collaboration by integrating various business processes and functions, and lead to improved decision making by providing access to real-time data across different departments and units. The benefits of ERP include reduced resource consumption and throughput time; improved planning and delivery time; better product and service quality; reliable data and standardized reporting; improved communication, collaboration and customer satisfaction; and improved productivity and efficiency (Kirmizi & Kocaoglu, 2020; Sadrzadehrafiei et al., 2013). There are two types of ERP systems: On-premise ERP is deployed in the internal IT environment of an organization; and Cloud-based ERP is deployed in a Cloud environment (Gupta, Kumar, Singh, Foropon, & Chandra, 2018). Compared to on-premise ERP systems, still highly used (Ozbek, Yıldız, & Alan, 2021), Cloud-based ERP offers advantages such as considerably reduced costs and improved agility and flexibility (AlBar & Hoque, 2019; Motalab & Shohag, 2011).

While traditional software is relatively easy to choose, install, and gain quick benefits, ERP systems are different. Because of their structure, it is sophisticated and difficult to succeed (Chaveesuk & Hongsuwan, 2017). Research shows that few ERP systems are successful, and more than 50% of them encounter problems, such as budget exceeding and duration overruns in the ERP projects, and fail or conflict with organizations' strategic objectives (Chaveesuk & Hongsuwan, 2017; Panorama, 2016; Stefanou, 2001). Success of systems like ERP depends on a high degree of functional integration and the alignment with organizational strategies. When alignment is strategic, it can have a positive impact on performance (Al-Surmi, Cao, & Duan, 2020; Wu, Straub, & Liang, 2015). According to Reich and Benbasat (1996), alignment is the "linkage" and "the degree to which the IT mission, objectives, and plans support and are supported by the business mission, objectives, and plans" (p. 56). Alignment is related to the "synergy", "fit", and "integration" between business and IS/ES strategies (Chung, Rainer Jr., & Lewis, 2003; Hirscheim & Sabherwal 2001). We define ES alignment as the linkage level of ES functionalities that support business strategies to reach predetermined business objectives.

ES alignment is also associated with ES and ERP flexibility. According to Duncan (1995) flexibility refers to "the ability of a resource to be used for more than one end product" (p. 42). A flexible ERP system provides the adaptation of business processes, which supports a variety of strategies and ensures rapid response to continuous changes of business demands (Pasaribu, 2016). In today's dynamic environment, ERP flexibility is critical for organizational performance and success. In this study we examine flexibility from a strategic point of view under ERP concept, which is also associated with ES in general. This strategic ERP flexibility enhances the capabilities of an organization to respond to the needs of the business environment through effective and supportive use of ES. It enables organizations to generate state-of-the-art solutions, introduce new products or services when opportunity appears (Carignani & Seifert, 2000), observe competitors behaviors, identify and evaluate new business opportunities, apply changes based on business requirements and have lessons learned (Tian, Wang, Chen, & Johansson, 2009; Bowman & Hurry, 1993; Brozovic, 2018; Matalamäki & Joensuu-Salo, 2021). Since ERP is a strategic ES, flexibility of its nature from the strategic point of view would have an impact on alignment.

Because of its potential implications, researchers and practitioners have considered alignment as a top priority of organizations (Chan & Reich, 2007; Gerow, Grover, Thatcher, & Roth, 2014; Kappelman, McLean, Luftman, & Johnson, 2013). However,

historically, organizations experienced difficulties in achieving alignment as it is a complicated and multi-dimensional construct (Johnson & Lederer, 2010). 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. Researchers need to focus on lower-level models about any type of ES alignment rather than concentrate on a generic model in the dynamic, global, and competitive business environment (Loukis, Sapounas, & Aivalis, 2010). Accordingly, this study examines the strategic alignment of business strategies and ES, and their relationship with the strategic ES/ERP flexibility.

Drawing on contingency theory, this study is a systematic extension of previous seminal works by Venkatraman (1989), Chan (1992), Chan, Huff, Barclay, & Copeland (1997), and Sabherwal and Chan (2001), and comprises three key objectives: (1) use and validate an instrument to measure business strategy, ERP strategy, strategic fit between ERP strategy, business strategy and business performance; and (2) identify the impact of strategic ERP flexibility on alignment of business strategies and ES as well as on business performance. The explicitly stated research questions are: What is the impact of strategic alignment and flexibility on performance?

This paper is organized as follows: the next section introduces the theories underpinning this study and analyzes the alignment, strategic ERP flexibility, and performance literature, as well as the theoretical model; the third section documents the methodology mentioning the design of the study; and the fourth section provides the results of our study. In the last section, the paper is finalized with a discussion and conclusion section.

2. Literature Review

2.1 ERP Systems

ERP systems integrate both the functions and processes of organizations to create a seamless, and more effective and efficient approach for their operations (Gupta et al., 2018). They help organizations collect, manage, analyze, and record data from various sources (Gupta, Qian, Bhushan, & Luo, 2019). In today's business circumstances, deploying ERP systems is required due to the intense competition, continuous changing and uncertain natures of markets (Shukla, Agarwal, & Shukla, 2012).

In general, there are two types of ERP systems: i) On-premise ERP system is deployed in the internal IT environment of an organization. It requires substantial investments of the organization on hardware and software as well as on maintenance and services; and 2) Cloud-based ERP solution is deployed in a Cloud computing environment (Gupta et al., 2018). Cloud computing refers to "a model for enabling flexible, on-demand network access to a shared pool of configurable computing resources that are delivered and released with minimal management effort from the client side, and with minimal need for client and service-provider interaction" (Demi & Haddara, 2018, p.589). It enables organizations to deploy and run applications more rapidly, and to access and share data and resources to achieve coherence (Gupta et al., 2019). With the advent of Cloud computing, organizations are increasingly moving their on-premise ERP systems into Cloud-based solutions (AlBar & Hoque, 2019). Cloud ERP systems provide advantages such as lower deployment and maintenance costs, fast execution, and improved agility, allowing organizations to deal with the uncertainties and fluctuations in the markets and gain competitive advantages (Motalab & Shohag, 2011; Gupta et al., 2019).

2.2 Contingency Theory

Contingency theory contends that the outcomes of an organization are the results of the level of fit between two or more factors (i.e., structure and process, and context) (Ghasemaghaei, Hassanein, & Turel, 2017; Goodhue & Thompson, 1995). That is, the organizational structure and process must fit its context (e.g., the characteristics of the organizational culture, environment, technology, size, or task) (Drazin & Van de Ven, 1985). Studies on strategic alignment illustrate that the fit between these factors leads to advanced performance, whereas misalignment causes performance decrease (Al-Surmi et al., 2020; Oh & Pinsonneault, 2007; Wu et al., 2015).

Drazin and Van de Ven (1985) define three approaches to the fit/alignment: i) selection approach proposes that fit is the presumed assumption underlying congruence between context and structure; ii) interaction approach (i.e., bivariate interaction) suggests that fit is the interaction of relevant organizational context-structure factors and their impact on performance; and

iii) systems approach considers that fit is the uniformity of multiple contingencies along with structural characteristics affecting performance.

Contingency theory is the foundation of this study, and we adopt interaction and systems approaches to examine the research hypotheses. While the interaction approach allows us to investigate fit between certain pairs of context-structure relationships, the systems approach provides a more comprehensive multi-variables analysis and holistic method to study the patterns in multi-dimensions (Drazin & Van de Ven, 1985; Taskin, Verville, & Keskin, 2014).

2.3 Business Performance

The performance concept has long been debated in business and ES literature. Two common performance measurements exist (Bergeron, Raymond, & Rivard, 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; Venkatraman, 1989). In ES research, most researchers prefer subjective measurements of performance over objective ones since objective measurements generally have serious limitations. Oftentimes the consistent and comparable data of objective measurements is difficult to collect from the entire sample of a research (Singh, Darwish, & Potočnik, 2016). It happens in the situations, such as private companies which are not obligated to declare their financial statements (Singh et al., 2016). In addition, in cross industry studies, profit levels can vary substantially across industries (Vij & Bedi, 2016). In this case, subjective measurements may be more appropriate as managers can consider the relative performance observed in the industry they perform when providing data (Brewer, 2006; Vij & Bedi, 2016)

Therefore, in this study, the subjective perception of several financial ratios is considered for measuring performance. 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 (i.e., relative to competitors) is related to market growth (i.e., revenue growth and market share gains), profitability (i.e., net profits and 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 ROI; and product-service innovation has been measured through the frequency of product, service, and technology development and introduction.

2.4 Calculation of Alignment

Calculation of alignment is critical for studies using alignment. Unfortunately, literature provides only a limited number of ways for measuring alignment. However, Venkatraman (1989), in his seminal work, conceptualized alignment or fit into six categories: "Fit as Moderation", "Fit as Mediation", "Fit as Matching", "Fit as Gestalt", "Fit as Profile Deviation", and "Fit as Covariation". In this study, we examine firm level strategic alignment where alignment is considered as a hybrid state. The appropriate alignment measurement would be either fit as matching, fit as moderation, or fit as profile deviation (Venkatraman 1989), which are also the most commonly used approaches in IS research (Tallon & Pinsonneault, 2011). Based on the research questions and components, this study performs analysis using fit as matching, one of the mostly used alignment methods.

Alignment as matching refers to the match between two variables independent of any anchor (Venkatraman, 1989). The main argument of this type of alignment is the requirement to get a difference between each related pair. 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. Formula 1 represents the mathematical notation of fit as matching.

$$Y = a_0 + a_1X + a_2Z + a_3(|X - Z|) + e \qquad \text{Formula (1)}$$

where X refers to STOBE, Z refers to STROES, and |X-Z| is the difference that will be used as deviation scores, while a0, a1 and a2 are the coefficients and e is the error term. In addition to the general calculation of matching, alternative approaches where fit as calculated via sign difference, summed difference and summed interaction (Chan, 1992).

2.5 Alignment and Business Performance

There is a consensus between researchers and practitioners regarding the positive impact of the alignment of business and ES on organizational performance (Alghamdi, 2018; Coltman, Tallon, Sharma, & Queiroz, 2015; Gerow, Thatcher, & Grover, 2015; Uysal & Cetinkaya, 2021). Researchers have investigated the strategic alignment of various ES concepts such as IT organization structure, ES strategic orientation, and IT investments (Chan et al., 1997; Majhi, Anand, Mukherjee, & Rana, 2021; Oh & Pinsonneault, 2007; Sabherwal, Sabherwal, Havakhor, & Steelman, 2019). Aligning business and ES strategies enables the enhancements of innovation, productivity, sales growth, cost control, and profits (Tallon & Pinsonneault, 2011). Coltman et al. (2015) argue that, recently, maintaining ES alignment has become more important to organizations as misalignment would not only cause the performance decline, but result in difficulties maintaining their competitive advantages and business agility. Correspondingly, we hypothesize that ES alignment will result in a better business performance.

Hypothesis 1: Alignment is positively associated with business performance.

2.5.1 Alignment, Flexibility and Business Performance

Aligning ES to business strategies is contingent on many parameters. In an ERP implementation project at its initial stages, executives and ERP implementers define clear business strategies. Then, implementers select an ERP package or service from Cloud service providers to streamline processes within defined strategies. However, not all ERP systems have the same flexibility level. Some ERP packages contain extremely inflexible modules which require changes in business processes. In such a case, expecting a seamless alignment between ES and business strategies would be naiveté unless senior executives are willing to change business strategies. Expecting flexibility from the business strategy is usually not an option, therefore examining ES flexibility as a construct can contribute to the ES alignment literature.

Despite 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, Albu, Albu, Dumitru, and Dumitru (2015) show how the ERP system supports strategy formulation and implementation, thereby provides a significant improvement in organizational performance. Hou (2020) indicates the positive and indirect impact of IT infrastructure integration and flexibility on organizational performance where the study examined also the mediation of supply chain capability. While Chung, Byrd, Lewis, and Ford (2005) report no significant relationship between ES structure and performance, they state ES structure may have an impact on "intermediate performance variables and not overall business performance variables like ROI or market share" (Barua, Kriebel, & Mukhopadhyay, 1995, p.39; Chung et al. 2005). Duncan (1995) states alignment has positive impacts on business and strategy; however, it does not have such an impact on flexibility.

Considering that i) alignment has related a proper and supportive use of ERP with business strategies and objectives whilst having the objective to support the business in relation 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, we can hypothesize that:

Hypothesis 2: Alignment mediates the relationship between flexibility and business performance.

2.6 Strategy Attributes

The constructs of the study have been adapted from validated studies including Venkatraman (1989) and Miles and Snow (1978), where Segev (1989), Chan (1992), Sabherwal and Chan (2001), Cragg, King, and Hussin (2002) have been used for the selection and combination of the factors and concepts. The constructs are categories under: Business Strategy, ERP Strategy, Performance Attributes, and the strategic ERP flexibility constructs.

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

- Company aggressiveness whose objectives include dominating market and prices even if it requires reducing financial ratios, prices, profitability;
- 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 and suppliers;
- Company futurity focuses on methods of long-term and strategic planning such as forecasts, benchmarking future trends, and "what-if" analysis to minimize the residual uncertainty (Morgan & Strong, 2003);
- Company pro-activeness focuses on developing new products and services, acquiring businesses, and seeking new opportunities;
- Company riskiness is those who do not hesitate to take risks for businesses and projects;
- Company innovativeness focuses on development of solutions through experimentation and creativity.

As in studies like Chan et al. (1997), Ilmudeen and Bao (2020), Ilmudeen, Bao, and Alharbi (2019) and Sabherwal and Chan (2001), ERP/ES Strategic Attributes were developed through a mirroring approach for alignment as matching approach where the same categories were used for both business and ES strategy attributes. The categories include ERP Support for aggressiveness, analysis, defensiveness, futurity, pro-activeness, riskiness, and innovativeness. These attributes refer to the extent to which current ERP systems provide support to 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 on plans. Therefore, for each question for business strategy, there is one matching 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.

This study focuses on realized strategy (Epik & Gökşen, 2020), 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)), ERP/ES 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 (see Figure 1) illustrates business strategy, ERP strategy, and their alignments have an impact on business performance. In addition, ERP flexibility has direct and indirect effects on business performance as well.

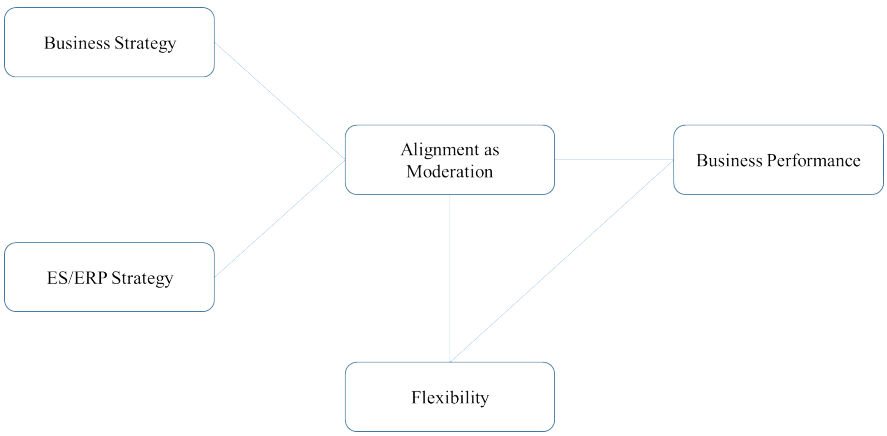

Figure 1. Theoretical Model as Part of a Structural Equation Model

3. Research Methodology

Survey research is the suitable and preferred method for collecting primary data relating to "describe, compare, or explain individual and societal knowledge, feelings, values, preferences, and behavior" (Fink, 2008, p.1). The most appropriate strategy considering the research questions, objectives, and foreseen analysis of the current study, is the questionnaire surveys followed by quantitative data analysis.

The instrument for this study was adapted from Venkatraman's (1985) study of Strategic Orientation of Business Enterprise (STROBE) and 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 and Chan (2001), Chan (1992), Venkatraman (1985), Segev (1989), Chan (2002) and Luftman, Papp, and Brier (1999) have been used as well as the appropriate perspectives of fit, which are fit as matching. The survey questions used a five-point Likert scale. As suggested by Dillman (2007), a small pre-test was conducted to make sure respondents understood the questions correctly and their responses were as expected based on literature.

Potential participants were identified from various databases like Industry Canada Site, Lexis Nexis, and Hoovers working in North America from manufacturing and service industries, and invited to fill-out the survey after obtaining ethics approval from the ethics board of the university. 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. 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 1).

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 the companies had 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 1).

Table 1. *Demographics of participants*

Job Title	***Percentage***	**Sales Volume**	***Percentage***
CIO	13	100.000.000 plus	45.7
IT Manager	40.25	10.000.000-99.999.999	25.0
User*	6.50	1.000.000-9.999.999	13.0
Other	40.25	500.000-999.999	8.7
(CEO, CFO)			

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

Considering the roles of participants, the return rate, which is not very high, was as expected. Accordingly, to examine any potential issues with the study, we investigated the possibility of non-response bias. With this purpose, data were divided into two, based on time of responses categorized as early and late respondents. A non-response bias test was conducted through the examination of difference on two waves, early and late returns (Armstrong & Overton, 1977; Lambert & Harrington, 1990; Bose, 2001). After examination of the response times, early respondents corresponded to two-thirds of the whole data. After performing a t-test for differences in the means of early and late responses, we did not find any significant difference among these survey items. Therefore, our results indicate that a non-response bias is unlikely to be a problem for internal validity.

4. Analysis

In this study, we have utilized SPSS and WarpPLS, a Structured Equation Modeling (SEM) based statistical tool to conduct the analysis. Partial Least Squared (PLS) is a SEM based tool that has been used for the analysis of data. PLS is known as a second-generation multivariate method that can identify linear as well as nonlinear relationships among the constructs. PLS is a variance based method, unlike SEM, that is covariance based (Chin & Newsted, 1999). PLS is also prediction oriented

and a nonparametric method capable of modeling both formative and reflective relationships. PLS demonstrates high accurate prediction capability, with even complex models (Chin & Newsted, 1999, p.314). In addition, PLS is capable of simultaneously apprising the theoretical model and measurement model (Chin, Marcolin, & Newsted, 2003). PLS has superiority over SEM under several conditions: i) predicting a model; ii) lack of clearly defined theory or measures; iii) large number of indicators; iv) data are not normally distributed; and v) small sample size (Barclay, Higgins, & Thompson, 1995; Chin & Newsted, 1999; Fornell & Larcker, 1981). The minimum sample size for PLS analysis, as a rule of thumb, is five (Bahli & Büyükkurt, 2005) (Gopal, Bostrom & Chin, 1992) or ten times (Chin & Newsted, 1999) "the maximum number of paths aiming at any construct in the model (including the paths of formative indicators)" (Huth, 2008, p. 92).

In PLS-based analysis, first the measurement model is tested. This set of analysis includes validity and reliability tests. Factor analysis reveal the loadings of all items were above the threshold value of 0.5, stating acceptable discriminant validity of the instrument. Two well-known and established measures to assess reliability are Cronbach's alpha and composite reliability (Fornell & Larcker, 1981) (Nunnaly, 1978). The acceptable value for Cronbach's alpha is 0.7, while 0.6 is marginally acceptable (Hair, Black, Babin, Anderson, & Tatham, 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 0.589 and the largest value is 0.767; while the minimum composite reliability measurement is 0.785 for risk aversion and the maximum value is 0.843 for analysis. The reliability score is closely related to the number of items in a scale as the relationship between the two is curvilinear (Komorita & Graham, 1965). In cases where the reliability score is less than six, while one option could be removing one item from the scale or keeping it if it is close to six. Although Cronbach's alpha for the Risk Assessment construct is slightly lower than 0.6, as results are very close and composite reliability, the more conservative measure of reliability, is above the threshold value of 0.7, our results indicate an acceptable reliability for the measurement model. Table 2 shows factor loadings and reliability measurements of the study.

Table 2. *Factor Loadings and Reliabilities for Business Strategy Types*

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

Notes:
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 3 shows the 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). Following the factor analysis, another discriminant validity was measured using average variance extracted (AVE) values (shown in diagonal, in parentheses). For a valid discriminant validity, the square roots of AVE values are expected to be greater than the correlations of that variable with all the factors in the model. 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 3. *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).*

After establishing a valid and reliable measurement model for the business strategy component of the study, the same analysis was performed for the ES/ERP strategy component as well. The results, as in Table 4, indicate the item loadings are high and above the required threshold values and the reliability of the instrument is marginally acceptable (Hair et al., 2006). 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 4. *Factor Loadings and Reliabilities for ERP/ES Strategy Types*

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

Factor loadings above one do not show any problems with oblique rotation, the default rotation was used for confirmatory analysis using WarpPLS. "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" (Kock, 2010, n.d.).

Further analysis on performance and flexibility showed that all items for these constructs are loading on the right factors as they were supposed to. While the Cronbach's alpha for flexibility was 0.880, the composite reliability measure was found as 0.907, indicating good reliability. The performance construct was designed as a second order construct for the study. However, in order to ensure the validity of the performance construct, it was examined in more detail by performing a reliability analysis on it at first level. The results showed that there was no cross-loading on the factors and each sub-level of performance

measures as Absolute Financial Performance (0.887 and 0.912), Relative Financial Performance (0.862 and 0.907) and Product-Service Innovation (0.697 0.832) had acceptable Cronbach's alpha and composite reliability scores, respectively.

For testing the relationships between alignment, flexibility and business performance, fit as matching with absolute difference was used as suggested by Chan (1992). The results indicate a positive and significant association between alignment and business performance (β=0.24, $p<0.05$), as well as alignment and flexibility (β=0.24, $p<0.05$). On the other hand, the results did not reveal a significant association between performance and flexibility. The variance explained by the model was 0.47. Structural models using SEM-based analysis must provide an acceptable level of model fit. PLS analysis uses Average Path Coefficient (APC) and Average R-Square (ARS) to indicate model fit (Kock, 2010). Results show that both APC (0.342, $p<0.05$) and ARS (0.284, $p<0.05$) have significant results while the Average Variance Inflation Factor (AVIF) is 1.552 and less than five (see Table 5). These results indicate good model fit.

Table 5. *Alignment as matching, performance and flexibility*

Alignment Type	***Construct***	**Relational Constructs**		***R2***	**Model Fit**		
		Alignment	*Flexibility*		*APC*	*ARS*	*AVIF*
Matching – Absolute Differ.	*Alignment*	-	*0.69***	*0.47*	*0.342***	*0.284***	*1.552*
	Performance	*0.24***	*0.10 / 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
APC: Average Path Coefficient
ARS: Average R-Square
AVIF: Average Variance Inflation Factor
Flexibility: Strategic ERP Flexibility

In addition to the structural model, additional tests to assess mediation were conducted. Among these mediation tests, the Sobel test (Sobel, 1982; Baron & Kenny, 1986), the Aroian test (Aroian, 1944/1947) and the Goodman test (Goodman, 1960) are highly used. Our results show strong mediation of alignment on the relationship between flexibility and business performance with the results of 2.82 for the Sobel test ($p<0.05$), 2.8 for the Aroian test ($p<0.05$) and 2.83 for the Goodman test ($p<0.05$).

After conducting the required analysis, our results indicate our hypotheses have been supported. Table 6 shows the status of all hypotheses.

Table 6. *Status of Hypotheses*

Hypotheses	**Status**
Hypothesis 1: Alignment is positively associated with business performance.	Supported
Hypothesis 2: Alignment mediates the relationship between flexibility and business performance.	Supported

5. Discussion

5.1 Results

Underpinned by contingency theory, in this study, we have examined the strategic alignment of business and ES strategies and its relationship with performance. In addition, theorizing the role of strategic ERP flexibility provides a better understanding of alignment and its antecedents.

Business performance is associated with other functions of business and ES. Alignment of ES with business strategies and its flexibility are among the most important factors that academics have cited for the last several years that have an impact on performance (Chen, Wang, Nevo, Benitez, & Kou, 2017; Mikalef, Pateli, & van de Wetering, 2021; Tallon & Pinsonneault, 2011). 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 to get a better understanding of business performance. The alignment of business and ERP allows organizations to adapt to dynamic environments (Majhi et al., 2021; Tallon & Pinsonneault, 2011) faster and more efficiently, and ERP flexibility helps organizations to update their technical structure

more effectively (Albu et al., 2015; Jorfi, Nor, & Najjar, 2017; Kumar & Stylianou, 2014). Having access to up-to-date technology with the ability to use it would bring competitive advantage to organizations over their competitors; thus, leading to an increase in their performance.

In this study, we have examined strategic alignment and used alignment as matching. 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. Our results demonstrate that alignment has a significant and positive impact on performance, and these results support the findings of previous studies (Alghamdi, 2018; Chan & Reich, 2007; Sabherwal et al., 2019). Results also reveal that flexibility has an impact on performance through alignment. In other words, alignment mediates the relationship between flexibility and performance. Our results support studies, such as Chung et al. (2003) and Bazrafshan and Mahmoudi (2018), whose findings indicate ES flexibility has an impact on alignment. Our results are also parallel with previous researchers' statements (e.g., Duncan, 1995; Al-Surmi et al., 2020; Chen et al., 2017) regarding a flexible ES improving the performance of organizations, and the flexibility of ERP systems having a role on performance change when there is strategic alignment between business and ERP.

5.2 Implications

Because of the strategic importance of ERP systems, alignment of ERP should be included in strategic planning by management. When it comes to strategic planning, professionals from top management to stakeholders, ES people to customers, should be involved and participate through discussions. This type of coordination is more beneficial to 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 business world; iii) and whether the ES and business objectives are still matching (Lederer & Mendelow, 1989). An organization can employ one or a combination of planning techniques such as "stages of growth", "critical success factors", "competitive forces model", "three emerging forces", "value chain analysis", "e-business value matrix", "linkage analysis planning", and "scenario planning" (Pollack, 2010). We recommend that, regardless of the technique, management should consider the impact of ERP on the organization and proceed with their planning.

This study can also help ES practitioners to prioritize their ES plans and investments. When there is a shift in a business environment, organizations will probably need to assess their plans and investments through the ERP and/or business strategies in order to keep up with or improve their performance (Bergeron, Raymond, & Rivard, 2004; Sabherwal & Chan, 2001). In that case, this study will help managers and practitioners to guide and assess their situation.

5.3 Limitations and Future Study

The study is not without limitations. The main limitation of this study we can mention is the 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 (i.e., CIO, CFO, and CEO), and those we did find, had very tight schedules. There were company policies regarding not participating in surveys, companies changing address, length of the questionnaire survey, and finding knowledgeable participants. In spite of this limitation, our results can still provide 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 argue about the subjective nature of performance measures. 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). Since several researchers (e.g., Chan et al., 1997; Venkatraman, 1989; Venkatraman, 1985) have proven the validity of the instrument and measurement on various contexts, we have not foreseen any problems with proceeding with the extended instrument.

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. Multiple respondents and triangulation from organizations would provide more detailed results (Bergeron et al. 2004). However, based on the size of 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).

Alignment has several antecedents, and testing the model with one or more of these antecedents (e.g., management support, communication between ES and business departments, ease of integration, and connection between ES and business plans) would add to the alignment and strategy literature as future research. Other future studies may examine alignment at the process level to examine the alignment concept in more detail. In addition, studies about antecedents and enablers of strategic alignment under the concepts of flexibility and ERP systems, as well as other ES including supply chain, customer relationship management and knowledge management would provide a deeper understanding of such a complex and important phenomenon as alignment.

6. Conclusion

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 provides 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 costs to an organization. Meanwhile, research shows adopting an ERP system alone does not guarantee a competitive advantage or business performance benefits (Muscatello, Small, & Chen, 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 a high priority to alignment. In other words, strategic alignment is a requirement for an ERP system's success (Esteves & Pastor, 1999; Gibson, Holland, & Light, 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.

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 (e.g., Bitsini, 2015; Coltman et al., 2015) 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. Researchers (e.g., Drummond et al., 2017; Gable et al., 2001; Panayiotou et al., 2015) 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 (Afandi, 2017; Johansson et al., 2014; Ilmudeen, 2021). In addition, according to Kang, Park, and Yang (2008) and Siswanto and Utomo (2008), aligning ERP with organizational goals would enhance the competitive benefits as well as the organizational performance. These studies have inspired us to conduct this research to help practitioners and to theorize ERP alignment as an important subset of ES alignment.

The complex nature of alignment and performance connection requires deeper examination because such concepts do not usually exhibit a simple independent/dependent variable relationship (e.g., Prieto & de Carvalho, 2018; Wu et al., 2015; Yuliansyah & Jermias, 2018). Considering the fact that ERP is an enterprise-wide information system encompassing information technology, the flexibility of its structure would have an impact on alignment (Kumar & Stylianou, 2014). Based on these facts, aligning the ERP strategy would enhance the business performance while improving the business value (Gerow et al., 2014; Li et al., 2011; Wiedemann et al., 2020). 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 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. Organizations need to pay attention to both ES and business strategies during the alignment in order to succeed. As also mentioned by Chan (1992), managers need to consider the ERP strategy that will support and fit their organizations' strategic orientation when they are conducting their ES planning.

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