EFFECTIVE ERP AND SUPPLIER COORDINATION FOR PROCUREMENT PERFORMANCE: A CROSS-NATIONAL STUDY

by

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Abstract

In spite of the growing interest in the area of global procurement, limited numbers of empirical studies, particularly cross-national studies, are available and little attention has been paid to the competitive environment and internal enterprise resource planning (ERP) and external collaborative supplier practices. This paper focuses on how a firm's operational procurement outcomes demonstrate high levels of improved performance. Also, it presents a research model that describes key constructs, their interrelationships, and empirical tests of these relationships based on International Manufacturing Strategy Survey (IMSS) data. Theoretical and managerial implications are discussed as well.

Introduction

Global procurement has increased in importance exponentially, as it has become a corporate weapon to maintain or gain market share. Organizational and environmental factors have significantly contributed on this change in procurement activities (Bartlett et al., 2003; Czinkota and Ronkainen, 2005). First, the reduction of trade barriers throughout the world has caused a proliferation of foreign sourcing. Secondly, the ever changing business environment necessitates that corporations maximize the use of organizational competitiveness, cut costs, establish a quality product, and maintain a technological edge (Herbig and O'Hara, 1996; Cagliano et al., 2006). Thirdly, organizations need to create value to the end customer (Porter, 1980) by exceeding their

expectations in terms of quality, time, cost, flexibility, and functionality in both products and services (Gonzalez, Quesada, and Mora, 2004).

Hence, in today's international business dynamic, the procurement function cannot be viewed in isolation in a firm; it is important that the procurement function operates in conjunction with the corporation, and that the procurement strategies are consistent with corporate competitive strategy (Watts et al., 1995; Batenburg, 2007).

Sourcing is a complex process that contributes tremendously to the competitive advantage of an organization (Novack and Simco, 1991; Knudsen, 2003). As much as 70 percent of an organization's sales revenues or total manufacturing costs is spent on purchasing of raw materials, components, finished goods or services (Presutti, 2003; Lo and Yueng, 2004; Tayles and Dury, 2001). If sourcing costs can be reduced, this can improve returns on investments by increasing both profit margins and asset turnover rate (Dobler and Burt, 1996; Leenders and Fearon, 1997; Nollet et al., 2005). Yet, a global sound procurement strategy goes beyond simply acquiring goods and services, and contributes significantly to organizations not only by reducing costs, but as well by adding value through better operational links with suppliers, by distancing competitors through better quality inputs, and by shortening lead time (Fung, 1999; Roth and Pullman, 2008).

In this day and age, the purchasing function has changed from playing a supporting role to becoming a strategic activity, and now makes a significant contribution to the competitive advantage of an organization (Quayle, 2002; Carr and Smeltzer, 1997; Croom and Brandon-Jones, 2007). However, despite the attention paid to procurement,

there is a lack of literature, particularly cross-national studies, regarding the interrelationship among ERP systems, supplier coordination, and procurement outcomes.

Considering all these changes and challenges that firms and supply chains are facing, the present research study makes an important contribution to the extant body of literature concerning supply chain. This theoretical framework will help practitioners and academicians in understanding how ERP systems and supplier coordination impact international companies' procurement outcomes. It also lays a foundation for future research.

The next section (two) of this article discusses the theory development and hypotheses investigated in this study. This will be followed by section three, a discussion of our research methodology and section four, data analysis and results. Section five of the article discusses the implications of the findings and conclusions. Finally, section six concludes the article with a discussion of our research limitations and future research opportunities.

Theory Development

Figure 1 illustrates the research framework for this study. It depicts the relationship among supplier coordination, ERP system, and procurement performance. ERP system influences both supplier coordination and procurement performance. Supplier coordination, in turn, influences on procurement performance. Table 1 provides constructs definition and is followed by the theoretical foundation for the hypothesized relationships under study.

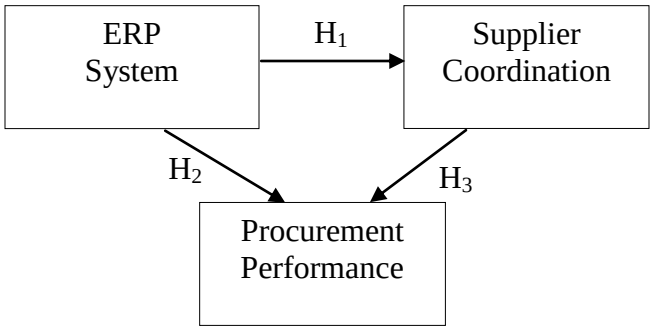

Figure 1: Research Framework

Construct	*Definition*	*Literature Base*
ERP System	The extent to which a firm uses ERP systems to coordinate with suppliers the integration of business processes and functions such as material management, production planning and control, and supply management.	Fox (2003; Al-Mashari et al. (2003); Mabert et al. (2001); Van Everdingen et al. (2000); Edwards et al. (2001); Bendoly and Schoenherr (2005)
Supplier Coordination	The degree to which a firm seeks to integrate and coordinate procurement requirements across and within business units with suppliers who are located worldwide.	Kotabe and Murray (2004); Moncza et. al. (2005); Faes et al (2003); Rozemeijer (2003); Trent and Monczka (2002)
Procurement Performance	The extent to which operational procurement outcomes demonstrate high levels of improved performance in lead time, cost, labor-productivity, and capacity utilization.	Gebauer et al. (1998); Quintens et al. (2006); Craighead et al. (2007); Choi and Krause (2006); Knudsen (2003); Fitzgerald, (1997); Rozemeijer, (2003)

Table 1: Constructs Definition

ERP System

Today's global business environments are characterized by unprecedented competitive pressures and sophisticated customers who demand innovative and speedy solutions. Understanding and optimizing business processes is a cornerstone of success in these fast-changing environments. Global distribution channels, numerous international plant sites, and closely integrated sourcing arrangements have changed the way hundreds of companies do business. According to Jacobs and Bendoly (2003) a key component of managing these organizations is Information Technology (IT). Over the past few years, many companies have embraced a new class of planning and resource management software systems to integrate business processes and functions such as material management, production planning and control, and supply management (Fox 2003). These package systems are broadly classified as Enterprise Resource Planning (ERP) systems (Al-Mashari et al., 2003).

Despite the implementation of ERP systems since the mid-1990s, academic research in this area is relatively new. It is only recently that researchers have dealt with various aspects of ERP in a more systematic manner. The initial thrust of many of these articles has been in the implementation area. Davenport (1998) in an early ERP article looked at the reasons for implementing ERP systems and the challenges of the implementation project itself. Van Everdingen et al. (2000) surveyed 2647 European companies across all industry types to determine adoption and penetration of ERP by functionality. Their findings show that European midsize business market is not homogeneous. Significant differences exist in selection criteria (i.e., support, scalability, user-friendliness, cost, flexibility, and fit) among countries.

Mabert et al. (2000) used a hybrid approach with a series of case studies followed by a survey to study penetration of ERP systems, motivation, implementation strategies, modules and functionalities implemented, and operational benefits as they apply to the US manufacturing sector. This study revealed a number of important facts for businesses. First, the planned/actual use of ERP systems is pervasive in the U.S. manufacturing sector for both large and small firms. Second, ERP does not appear to be a passing fad, given the investment expended and the time required to implement. Third, the move to a package ERP system represents a greater resource commitment for small firms. Fourth, there is a common core of functional modules for manufacturing firms that have been implemented most frequently, with some customization required. Fifth, ERP system implementation benefits are concentrated more in quickly providing high-quality information within the firm.

Adam and O'Doherty (2000) used case studies to study ERP implementations in small and medium enterprises in Ireland. They found that SMEs are just as likely to be interested in ERP as the larger organizations. Also, an experienced implementation partner can play a critical part in ensuring that organizations exploit their ERP platforms to the fullest and develop their IT capability beyond the mere use of ERP functionality.

In general terms, the key question is "how are ERP systems employed to effectively manage inventory?" Basically, the companies must make two basic inventory management decisions: first is how to track the inventory (i.e. to have information on how much is on hand, where it is located, how much will be used and by when), and second is how much and when to order (i.e. which of the conventional inventory control models, e.g., economic order quantity, economic run size, quantity discount models or

their variations will be implemented by ERP system). According to Mahesh and Amarpreet (2006) it is important to realize that an ERP system is a technology and not a model in itself; it is not there to take over management decision but to inform and complement the management's decisions on inventory management. Thus, what it does is to enable operations managers to adopt more effectively the inventory models best suited for their business environment. The ERP system can be set up to align itself to the current or chosen inventory management model (Mandal, 2002).

Supplier Coordination

Real global sourcing refers to the integration and coordination of procurement requirements across worldwide business units (Monczka et al., 2005; Rozemeijer, 2003; Faes et al., 2003) and with other functional groups, particularly R&D, manufacturing and marketing, within business units (Kotabe and Murray, 2004; Monczka et al., 2005). However, the integration and coordination of procurement requirements across business units (external interfaces) is challenging and difficult to master (Rozemeijer, 2003). The same can be said about the internal interfaces within individual business units.

Close cooperation inside the firm between purchasing and other departments is needed to facilitate foreign outsourcing (Mol et al., 2004; Quintens et al., 2006). To achieve maximum procurement benefit, firms often have to challenge entrenched systems and behaviors that work against collaborative efforts between and within business units (Trent and Monczka, 2002). This context raises a variety of questions concerning the nature, the organization, and the impact of global sourcing. How to source globally and how to manage a global supply base (i.e., how to develop effective business relationships

with suppliers who are located worldwide) have become critical competences (Kotabe and Murray, 2004).

Managing suppliers from a wide range of countries implies operational complexity (Mol et al., 2004) and relatively high learning cost on how to manage intercultural relationships (Andersen and Buvik, 2001). The critical importance of developing and sharing knowledge in multinational companies (MNCs) has been acknowledged by many researchers (Adenfelt and Lagerström, 2006; Buckley and Carter, 2004).

Procurement Performance

Easton, Murphy et al. (2002) present a summarized history of the procurement performance measurement in the literature, supporting mainly short-term gains until the late 1980s and early 1990s. One problem with those traditional metrics where that they worked to improve the procurement performance at the expense of other departments' performance, not achieving a global organizational measure of performance but a local measure working alone.

The global competitive environment drives organizations highly dependent on the success of supplier selection process. Any deficiency in coordination of the process will lead to excessive delays and poor customer service (Chung et al., 2004). In fact, suppliers are manufacturer's external organizations or business partners, and indeed their performance will decide the future performance of the whole supply chain (Samli and Browning, 2003).

At a tactical level, procurement involves numerous activities, consisting of many material and information flows. It is not as simple as to just convey a need from an internal customer to a supplier and deliver the item to the internal customer. Instead, this process consists of activities that are continuously changing in intensity, duration, and quality, thus producing variations in performance (e.g., time, cost, labor productivity, and capacity utilization), efficiency, and effectiveness of the purchasing department's work (Craighead et al., 2007; Choi and Krause, 2006). Therefore, the key elements that should be investigated in the procurement performance measurement system are resources, procedures, and output (Knudsen, 2003).

Porter (1980) states that procurement, as one of the functions of the firm, impacts the ability of the firm to achieve its goals, and therefore, it impacts the firm performance. Further studies (Carr and Smeltzer, 2000) suggest the importance of achieving higher levels of procurement performance in order to improve the firm's performance. The impact of procurement performance on firm performance is widely supported also from the practitioner's point of view.

The current globalized market trend identifies the necessity of the establishment of long-term business relationship with competitive global suppliers spread around the world. As companies are seeking ways of reducing costs, speeding time-to-market and improving product quality, supplier performance plays a critical role in maintaining the competitiveness of value chains (Fitzgerald, 1997; Rozemeijer, 2003). Sanchez-Rodriguez, Martinez-Lorente et al. (2003) provide evidence of a significant positive relationship between procurement performance and firm performance using a structural equation model.

Hypotheses

The following sections discuss the proposed relationships among ERP system, supplier coordination, and procurement performance shown in Figure 1.

ERP System

Kumar and van Hillegersberg (2000) review the evolution of ERP from the perspective of developments in manufacturing planning. Models for structuring the implementation process have also been suggested based on multiple cases study experiences (Markus and Tanis, 2000; Parr and Shanks, 2000). Because of such early efforts, many researchers now view ERP systems not only from benefits perspective, but more importantly as a necessity for maintaining future competitive advantage (Ndede-Amadi and Mykytyn, 1999; Jacobs and Bendoly, 2003).

ERP system is not a fad but one that addresses fundamental organizations. Many studies have concluded ERP systems can bring benefits in operational efficiency and reduced costs to organizations and enforce a discipline of best practice and consistency (Robinson and Wilson, 2001; Bose et al. 2008). The suppliers have access in real time to information regarding orders, supply plans and the quality of their supplies. Once the services offered to each supplier is the possibility of having online the entire history of its orders. In the same way, company buyers can evaluate different offers, archive orders in a shared database and, above all, activate a series of automated procedures during the procurement cycle, which reduce or even eliminate many of the activities, which have fewer added values (Mabert et al., 2001; Van Everdingen et al., 2000; Edwards et al.,

2001; Bendoly and Schoenherr 2005). Based on the previous literature, the researcher suggests:

Hypothesis 1: ERP system has a direct impact on supplier coordination.

In fact, adopting ERP systems as the primary platform for sharing and exchanging of organizational information and providing access to it through internet technology is considered a hallmark of leading organizations (Davenport, 2000). Moreover, not only implemented internally, but ERP systems are also being extended to include internet capability, customer relationship management (CRM), supply chain management (SCM) and support for the electronic market places (Sammon et al., 2001). Researchers pointed various benefits the organizations gain because of adopting ERP (Al-Mashari et al., 2003; Fox 2003).

This view is based on the idea that an ERP system is not simply a tool that provides a single output, but rather an infrastructure that supports the capabilities of all other information tools and processes utilized by a firm. In recent series of case studies, Palaniswamy and Tyler (2000) and Bose et al. (2008) emphasize this point. The authors state that ERP systems provide critical functionality by integrating information technologies relevant throughout the enterprise. Furthermore, the process of ERP system implementation forces organizations to increase their understanding of their core capabilities and make necessary changes to business processes that may otherwise have been ignored. Therefore, not only the package but also the process of implementation should be viewed as an opportunity to attain and maintain positions as market leaders.

The possibility of connecting many-to-many in real time offered by Internet allows sellers and buyers the opportunity to communicate and carry out transactions online. The advantage of carrying out electronic business are cost reduction, improved productivity, and customer service and the possibility to redesign inefficient company processes and increase the management and control of the relationships with the various players along the supply chain (Weller, 2000; Tan, 2001; Craighead, et al. 2007).

Thanks to the new web-based application, it is possible to reduce the lead time of the supply process and increase the reliability of the entire system. Furthermore, by improving efficiency, administrative costs are reduced and the resources dedicated to procurement are optimized (Bendoly and Schoenherr, 2005). Based on the previous literature, the researcher suggests:

Hypothesis 2: ERP system has a direct impact on procurement performance.

Supplier Coordination

In many of today's globalizing industries, procurement is one of the strategic functions with the highest potential impact on a firm's long-term profitability (Leenders et al., 2002). Cammish and Keough (1991), Keough (1993), and Kotabe and Murray (2004) emphasize on the importance of giving procurement a strategic role in the organization, and they agree that achieving world-class status in procurement requires many efforts in leadership, recognition of procurement's importance, and new metrics for procurement performance. Gebauer et al. (1998) and Quintens et al. (2006) establish that effective business relationships with suppliers impact procurement performance in term of cost, time, labor productivity, and capacity utilization.

Frohlich and Westbrook (2001) and Humphreys et al. (2005) stress the strategic importance of integrating operations with suppliers and customers in supply chains by providing empirical evidence of the impact of upstream and downstream supply chain integration on performance improvement. Strategic alliances are no longer a strategic option but a necessity in many markets and industries (Praise and Henderson, 2001; Cagliano et al., 2006). Four elements of more cooperative relationship discussed in the literature are supply base reduction, single sourcing, strategic partnerships, and early supplier involvement in product design (Stanley and Wisner, 2002; Adenfelt and Lagerström (2006). Stanley and Wisner (2001) empirically test the relationship between cooperative procurement/supplier partnerships and service quality to external customers by analyzing the mediating effect of procurement's service quality performance. Fynes and Voss (2002) provide further empirical evidence of the impact of buyer-supplier relationships on performance by analyzing it as a moderating variable in the relationship between quality practices and performance. Based on the previous literature, the researcher suggests:

Hypothesis 3: Supplier coordination has a direct impact on procurement performance.

Research Methods

Data were collected to test the relationship under study in 2005 during the International Manufacturing Strategy Survey (IMSS), a global research project. The IMSS was started in 1992 to gather data related to manufacturing strategies in a global setting. In nations where English is not commonly used, the questionnaire was translated into the local language by research coordinators and a typical full-time university faculty

in the areas of operations and supply chain management, thus ensuring reliable translation by someone familiar with the concept of business and operations strategy practices. Further information about the survey administration of IMSS can be found in Voss and Blackmon (1998), Frohlich and Westbrook (2001), and Cagglino et al. (2006).

Data were collected by national research groups within the global network using a standard questionnaire. Seven hundred sixty-one (761) plant managers or manufacturing executives completed a standard survey instrument, representing firms with more than one-hundred (100) employees, from twenty-four (24) countries throughout the Asian Pacific, European, North American, and South American regions. All firms included in the study are considered to be manufacturers according to International SIC (Standard Industrial Classification) code standards. Specific manufacturing industries included: (1) fabricated metal products, (2) machinery and equipment, (3) office, accounting, and computing equipment, (4) electrical machinery, (5) radio, television, and communication equipment, (6) medical, precision, and optical instruments, (7) motor vehicles, trailers, and semi-trailers, (8) other transportation equipment, and (9) other miscellaneous manufactured products. Firms were contacted prior to mailing to assess participation interest. The response rate varied by country, however, all exceeded 25%, which is commonly considered as adequate for a survey method research.

Data Analysis and Results

The purpose of the study guided the procedure to select items relevant to measure the concepts (Cagliano et al., 2006). Exploratory factor analysis deemed suitable to identify and distinguish factors among variables (Hair et al., 2006). In addition, all of the measures were theorized and supported by virtue of literature review

as discussed earlier and displayed in Table 1.

Measures

All the items displayed in Table 2 exhibit factor loadings. SPSS 16.0 was adopted for the analysis. Factor loadings were the result of utilizing Principle Components Analysis extraction method with Varimax rotation. The analysis filtered factors with Eigenvalues > 1.0, while the absolute coefficient values were suppressed at < 0.4 as these values are considered small (Hair et al., 2006) and not indicative of cross-loadings. Factor loadings were also analyzed for convergent and discriminant validity.

Three factors emerged in the analysis, all with loadings above 0.6, an evidence of well defined structure (Hair et al., 2006). Reliability was tested using Cronbach's alpha. All of the factors scored adequately, well over accepted standard of 0.7 suggested by Hair et al. (2006) for confirmatory research.

In addition, most factor loadings exceeded 0.7 and Cronbach's alphas and composite reliabilities are all above 0.7, demonstrating convergent validity (Bagozzi and Yi, 1988). Factor loadings also demonstrated adequate discriminant validity among the factors as no cross-loadings exceeding 0.4 are present. Furthermore, all Average Variance Extracted (AVE) values are above 0.5.

Measurement Model

Analysis of Moment Structures (AMOS 5) was employed to test the measurement model as it is customary for theoretical model testing (Hair et al., 2006). Hair et al. (2006) recommend the use of one absolute fit index, one incremental, and the chi-squared result as measures for the overall fit of the measurement model. Absolute indices directly

		ES Loadings	SC Loadings	PP Loadings
ERP System				
To what extent are the following management areas supported through the use of Enterprise Resource Planning systems? (1-no use; 5-high use)				
ES1	Material management	0.916		
ES2	Production planning and control	0.852		
ES3	Purchasing and supply management	0.918		
Supplier coordination				
How do you coordinate planning decisions and flow of goods with your key/strategic suppliers? (Level of adoption: 1-none; 5-high)				
SC1	Share inventory level knowledge		0.712	
SC2	Share production planning decisions and demand forecast knowledge		0.651	
SC3	Order tracking/tracing		0.726	
SC4	Agreements on delivery frequency		0.623	
SC5	Dedicated capacity		0.715	
Procurement Performance				
How has your operational performance changed over the last three years? (deteriorated more than 10% - 1; Improved more than 50% -5)				
PP1	Procurement lead time			0.742
PP2	Procurement costs			0.840
PP3	Labor productivity			0.785
PP4	Capacity utilization			0.711
Eigenvalue		2.466	2.425	1.844
Cronbach's alpha		0.893	0.751	0.772
Composite reliability		0.749	0.895	0.779
Average Variance Extracted		0.556	0.781	0.610

*Varimax rotation method was used for Factor analysis.

Table 2: Factor Analysis and Reliability Results

measure how well the specified model reproduces the observed data (Kenny and McCoach, 2003; Hair et al., 2006). The Root Mean Square Error of Approximation (RMSEA) test is an absolute fit index which considers values < 0.05 to demonstrate

good-fit (Hair et al., 2006). The RMSEA found in our model was 0.037, which is considerably lower than 0.05.

Incremental fit indices differ from absolute fit indices in that they examine fit of a specified model relative to some alternative baseline model, commonly referred to as a null model. The Comparative Fit Index (CFI) and the Tucker-Lewis Fit Index (TLI) were employed in this study as they are widely accepted as incremental model fit indices which consider values > 0.9 associated with a model that fits well (Hair et al., 2006). The CFI and the TLI obtained from the analysis of our research model were 0.97 and 0.96 respectively, which show strong evidence of incremental fit.

The Chi-squared is a key model fit test which examines the extent that a perfect fit exists between observed and estimated covariance matrices. Chi-squared increases as the extent that a perfect fit is not the case, as such, the objective here is for model fit performance to result in a small Chi-squared/degrees of freedom (X^2/df), typically < 3.0. It turned out to be 2.01 in our model, which shows that the research measurement model is a good fit. All measurement model fit indices fell within the acceptable ranges for scientific investigation. Table 3 summarizes the research model fit indices.

X^2/df	NFI	CFI	RFI	IFI	TLI	RMR	RMSEA
2.01	**0.95**	**0.97**	**0.93**	**0.97**	**0.96**	**0.067**	**0.037 (.029, .044)**

Table 3: Measurement Model Fit Indices

Structural Model

Figure 2 summarizes the structural equation modeling (SEM) that tests the relationships posited in the study (Anderson and Gerbing, 1988; Swink and Song, 2007).

Hypothesis, namely H_1, was empirically supported at a $p < 0.001$ level, and the other two, namely H_2 and H_3 were supported at a $p < 0.05$ level. ERP system has a direct impact on both supplier coordination (H_1) and procurement performance (H_2). Finally, supplier coordination has a direct impact on procurement performance (H_3).

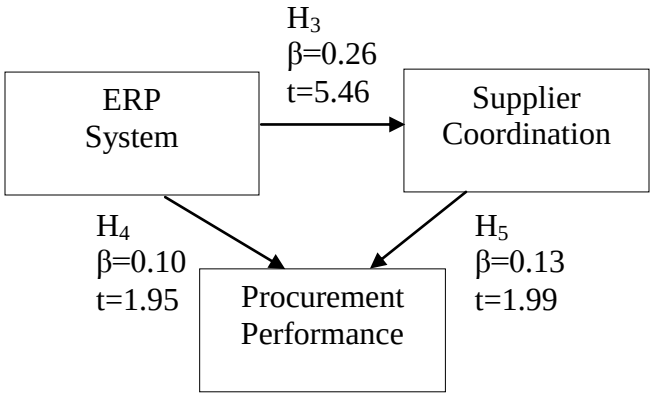

Figure 2: Structural Equation Model Results

Fit indices: X^2/df: 1.878 (X^2=135.217, df=72); CFI: 0.979; NFI: 0.957; RMSEA: 0.03

Implications and Conclusions

In the twenty-first century, it will no longer be single companies competing against each other. The individual company must position itself into a competitive supply chain and the different supply chains will compete against each other. The big return in ERP investment and future revenue and profit growth comes from integrating the company to its entire supply chain. A company will compete in the market based on the overall strength of its supply chain.

This study suggested that good management of supplier involvement and an agile supply chain can lead to better supplier performance, improved manufacturing, and

product and process improvements that in turn enhance customer satisfaction and firm performance. External environment or culture may have an impact on using ERP systems in the company. One reason is that the use of ERP is not pervasive. If partnering suppliers do not use ERP, the company is also reluctant to use it either to integrate supply chain across companies.

This research shows that ERP's main added value is its combination of financial control with multi-facility coordination, but ERP does not deliver supply planning and demand and demand planning functionality for the company. The systems are not designed to support internal supply chains. However, integration of supply chain management and ERP gives the company the opportunity to build effective processes with suppliers they trust, so they can get the maximum return on relationship with all their suppliers on a continuous basis.

The main conclusion from the study is that individual company should look at an effective purchasing function as one of the competencies essential to supply chain success. It is found that breaking the traditional decentralized system and introducing the concept of a single, integrated plan, which a company could work together with their suppliers lead to cost reduction and increased efficiency. This unique practice is suited to new market requirements.

Limitations and Future Research Opportunities

The study extends previous scholarly research on how a firm's operational procurement outcomes demonstrate high levels of improved performance through ERP systems and supplier coordination. In doing so, a large-scale, multi-industry sample of manufacturing firms was investigated, reducing concerns regarding generalizability.

That said, the study is certainly not without limitations. First, it addresses the traditional research questions of "what" and "how". The primary limitation of this study is consistent with any scientific investigation employing survey method in that while this approach is very useful for hypothesis testing, it requires further in-depth inquiry of "why" the findings resulted. Second, the sample under study excludes service firms, which are fundamentally different from manufacturers given the role of the customer as a co-producer in the product/service. As such, a rich research opportunity exists to investigate how ERP systems and supplier coordination may impact a service firm's operational procurement outcomes differently from that which occurs in a manufacturing environment. Third, while this study examines a broad array of firms from around the world, a comparative cross-cultural study could improve scholarly understanding of not only differences in firms' approaches, but also best practices. Finally, scholarly findings should be regularly replicated intentionally at first and later as a routine research task.

References

Adam, F. and O'Doherty, P. (2000). Lessons from enterprise resource planning implementations in Ireland—towards smaller and shorter ERP projects. ***Journal of Information Technology*** 15 (2000), 305–316.

Adenfelt, M. and Lagerström, K. (2006). Knowledge development and sharing in multinational corporations: The case of a centre of excellence and a transnational team 15 (4), 381-400.

Andersen, O. and Buvik, A. (2001). Inter-firm co-ordination: international versus domestic buyer–seller relationships. ***Omega*** 29 (2), 207-219.

Anderson, J. C. and Gerbing, D. W. (1988). Structural equation modeling in practice: a review and recommended two-step approach. ***Psychological Bulletin*** 103 (3), 411-423.

Al-Mashari, M., Al-Mudimigh, A., and Zairi, M. (2003). Enterprise resource planning a

taxonomy of critical factors. ***European Journal of Operational Research*** 146 (2), 352-364.

Bagozzi, R. P. and Yi, Y. (1988). On the evaluation of structural equation models. ***Academy of Marketing Science***. 16 (1), 74-94.

Bartlett, C. A., Ghoshal, S. & Birkinshaw, J. (2003). ***Transnational management: Text cases and readings in cross border management***, Illinois: Irwin/ McGraw-Hill.

Batenburg, R. (2007). E-procurement adoption by European firms: A quantitative analysis. ***Journal of Purchasing and Supply Management*** 13, 182-192.

Bendoly, E. and Schoenherr, T. (2005). ERP system and implementation-process benefits Implications for B2B e-procurement. ***International Journal of Operations and Production Management*** 25 (4), 304-319.

Bose, I., Raktim, P., and Ye, A. (2008). ERP and SCM systems integration: The case of a valve manufacturer in China. ***Information and Management*** 45, 233-241.

Buckley, P. J. and Carter, M. J. (2004). A formal analysis of knowledge combination in multinational enterprises. ***Journal of International Business Studies*** 35 (5), 371-384.

Cagliano, R., Caniato, F., and Spina, G. (2006). The linkage between supply chain integration and manufacturing improvement programmes. ***International Journal of Operations & Production Management*** 26 (3), 282-299.

Cammish, R. and Keough, M. (1991). A strategic role for purchasing. ***Mckinsey Quarterly*** (3), 22-50.

Carr, A. S. and Smeltzer, L. R. (1997). An empirical based operational definition of strategic purchasing, ***European Journal of Purchasing and Supply Management,*** 3 (4), 199-207.

Carr, A. S. and Smeltzer, L. R. (2000). An Empirical Study of the Relationships among Purchasing Skills and Strategic Purchasing. ***Journal of Supply Chain Management: A Global Review of Purchasing & Supply*** 36 (3), 40-54.

Choi, T. Y. and Krause, D. R. (2006). The supply base and its complexity: Implications for transaction costs, risks, responsiveness, and innovation. ***Journal of Operations Management*** 24 (5), 637-652.

Chung, W.W.C, Yam, A.Y.K. and Chan, M.F.S. (2004). Networked enterprise: A new business model for global sourcing. ***International Journal of Production Economics*** 87 (3), 267–280.

Craighead, C. W., Boone, C. A., and Bohler, J. A. (2007). Supply chain management technology: a review of empirical literature and research agenda. ***International Journal of Integrated Supply Management*** 3 (2), 105-124.

Croom, S. and Brandon-Jones, A. (2007). Impact of e-procurement: Experiences from implementation in the UK public sector. ***Journal of Purchasing and Supply Management*** 13 (4), 294-303.

Czinkota, M. R. and Ronkainen, I. A. (2005). A forecast of globalization. International business and trade: Report from a Detroit study. ***Journal of World Business***, 40 (2), 111-123.

Davenport, T. (1998). Putting the enterprise into the enterprise system. ***Harvard Business Review*** 76 (4), 121–131.

Davenport, T. H. (2000). ***Mission Critical: Realizing the Promise of Enterprise Systems***. Cambridge: Harvard Business School Press.

Dobler, D. W. and Burt, D. N. (1996). Purchasing ***and Supply Management: Text and Case***, 6th ed. New York: McGraw-Hill.

Easton, L., Murphy, D. J. and Pearson, J. N. (2002). Purchasing Performance Evaluation: With Data Envelopment Analysis. ***European Journal of Purchasing & Supply Management*** 8 (3), 123-134.

Edwards, P., Peters, M., and Sharman, G. (2001). The effectiveness of information systems in supporting the extended supply chain. ***Journal of Business Logistics*** 22 (1), 1-27.

Faes, W., Knight, L., and Matthyssens, P. (2003). Buyer profiles: An empirical investigation of changing organizational requirements. ***European Journal of Purchasing and Supply Management*** 7 (3) 197-208.

Fitzgerald, K. R. (1997). What OEM engineers want from suppliers. ***Purchasing*** 123 (2), 111-112.

Fox, D. M. (2003). ***Optimize Now (or else!): How to Leverage Processes and Information to Achieve Enterprise Optimization***. Nebraska: Universe, Inc.

Frohlich, M. T. and Westbrook, R. (2001). Arcs of Integration: An International Study of Supply Chain Strategies. ***Journal of Operations Management*** 19, 185-200.

Fung, P. (1999). Managing Purchasing in a supply chain context-evolution and resolution. ***Logistics Information Management*** 12 (5), 362-366.

Fynes, B. and Voss, C. (2002). The Moderating Effect of Buyer-Supplier Relationships on Quality Practices and Performance. International ***Journal of Operations & Production Management*** 22 (6), 589-613.

Gebauer, J., Beam, C. and Segev, A. (1998). Impact of the Internet on Procurement. ***Acquisition Review Quarterly*** 14 (1), 167-181.

Gonzalez, M., Quesada, G. and Mora, C. (2004). Determining the importance of Supplier Selection Process in Manufacturing: A Case Study. ***International Journal of Physical Distribution & Logistics Mangement*** 34, 6-10.

Hair, J., Black, W., Babin, B., Anderson, R., and Tatham, R. (2006). ***Multivariate Data Analysis***, 6th ed. Pearson Prentice Hall, Upper Saddle River, New Jersey.

Herbig, P. and O'Hara, B. (1996). International procurement: a matter of relationships. ***Management Decision*** 34 (4), 41-45.

Humphreys, P., Huang, G. and Cadden, T. (2005). A web-based supplier evaluation tool for the product development process. ***Industrial Management and Data Systems*** 105 (2), 147–163.

Jacobs, R. and Bendoly, E. (2003). Enterprise resource planning developments and directions for operations management research. ***European Journal of Operational Research*** 146 (2), 5-12.

Kenny, D. A. and McCoach, D. B. (2003). Effect of the Number of Variables on Measures of Fit in Structural Equations Modeling. ***Structural Equations Modeling*** 10 (3), 333-351.

Keough, M. (1993). Buying your way to the top. ***Mckinsey Quarterly*** 3, 41-63.

Knudsen, D. (2003). Aligning corporate strategy, procurement strategy and e-procurement tools. ***International Journal of Physical Distribution & Logistics Management*** 33 (8), 720-734.

Kotabe, M. and Murray, J. Y. (2004). Global sourcing strategy and sustainable competitive advantage. ***Industrial Marketing Management*** 33 (1), 7-14.

Kumar, K. and Van Hillegersberg, J. (2000). ERP experiences and evolution. ***Communications of the ACM*** 43 (4), 23-26.

Leenders, M. L., Fearon, H. E. (1997). ***Purchasing and Supply Management***, 11th ed, New York: McGraw-Hill.

Leenders, M. L., Fearon, H. E., Flynn, A. E., and Johnson, P. F. (2002). ***Purchasing & Supply Management***. New York: McGraw-Hill.

Lo, V.H.Y. and Yueng, A.H.W. (2004). Practical framework for strategic alliance in Pearl River Delta manufacturing supply chain: a total quality approach. ***International Journal of Production Economics*** 87, 231-240.

Mabert, V. M., Soni, A. K. and Venkataramanan, M. A. (2000). Enterprise resource planning survey of US manufacturing firms. ***Production and Inventory Management Journal*** 41 (20), 52–58.

Mabert, V. M., Soni, A., and Venkataramanan, M. A. (2001). Enterprise resource planning: measuring value. ***Production and Inventory Management Journal*** 42 (3/4), 46-51.

Mahesh, G. and Amarpreet, K. (2006). Enterprise resource planning systems and its implications for operations function. ***Technovation*** 26 (5-6), 687-696.

Mandal, G. (2002). Application of SAP R/3 in on-line inventory control. ***Internal Journal of Production Economics.***

Markus, M. I. and Tanis, C. (2000). The enterprise experience from adoption to success in Zmund, R. W. (Ed.), ***Framing the Domains of IT Management: Projecting the Future Through the Past***, Cincinnatti, Ohio.: Pinnaflex Educational Resources, 173-207.

Mol, M. J., Pouwels, P., Matthyssens, P., and Quintens, L. (2004). A technological contingency perspective on the depth and scope of international outsourcing. ***Journal of International Management*** 10 (2), 287-305.

Monczka, R., Trent, R., and Handfield, R. (2005). ***Purchasing and Supply Management***, 3rd ed., New York: Thomson South-Western.

Ndede-Amadi, A. A. and Mykytyn, P.P. (1999). What strategic alignment and enterprise resource planning (ERP) have in common: enterprise-wide computing. Proceedings of the 30th Annual Meeting of the Decision Sciences Institute, New Orleans, 643-645.

Nollet, J., Ponce, S., and Campbell, M. (2005). About "strategy" and "strategies" in supply management. ***Journal of Purchasing and Supply Management*** 11, 129-140.

Novack, R. A. and Simco, S. W. (1991). The industrial procurement process: A supply chain perspective. ***Journal of Business Logistics*** 12 (1), 145-168.

Palaniswamy, R. and Tyler, F. (2000). Enhancing manufacturing performance with ERP systems. ***Information Systems Management*** 17 (3), 43-55.

Parr, A. and Shanks, G. (2000). A model of ERP project implementation. ***Journal of Information Technology*** 15 (4), 289-303.

Porter, M.E. (1980). ***Competitive Strategy***: New York: Free Press.

Presutti, W.D. Jr. (2003). Supply management and e-procurement: creating value added in the supply chain. ***Industrial Marketing Management*** 32, 81-90.

Quayle, M. (2002). Purchasing in small firm. ***European Purchasing & Supply Management*** 8, 151-159.

Quintens, L., Pauwels, P., and Matthyssens, P. (2006). Global purchasing strategy: Conceptualization and measurement. ***Industrial Marketing Management*** 35, 881-891.

Robinson, B. and Wilson, F. (2001). Planning for the market?: Enterprise resource planning systems and the contradictions of capital. ***The DATABASE for Advances in Information Systems*** 32 (4), 21-33.

Rozemeijer, F. (2003). How to manage corporate purchasing synergy in a decentralized company? Towards design rules for managing and organizing purchasing synergy in decentralized companies. ***European Journal of Purchasing and Supply Management*** 6 (1), 5-12.

Roth, T. and Pullman, G. (2008). Unraveling the Food Supply Chain: Strategic Insights from China and the 2007 Pet Food Recalls. ***Journal of Supply Chain Management*** 44(1), 22-39.

Samli, A. C. and Browning, J. M. (2003). Developing competitive advantage: International sourcing as a strategic tool. ***Journal of Global Marketing*** 16 (4), 35-52.

Sammon, D., Adam, F., and Elichirigoity, F. (2001). Critical successful factors of process modeling for enterprise systems. ***Proceedings of the 7th American Conference on Information Systems, Boston, Massachusetts***, AIS, 2001, 3-5 August, 1131-1135.

Sanchez-Rodriguez, C. Martinez-Lorente, A. R. and Clavel, J. G. (2003). Benchmarking in the Purchasing Function and its Impact on Purchasing and Business Performance. ***Benchmarking: An International Journal*** 10 (5), 457-471.

Stanley, L. L. and Wisner, J. D. (2001). Service Quality along the Supply Chain: Implications for Purchasing. ***Journal of Operations Management*** 19, 287-306.

Stanley, L. L. and Wisner, J. D. (2002). The Determinants of Service Quality: Issues for Purchasing. European ***Journal of Purchasing & Supply Management*** 8 (2), 97-109.

Swink, M. and Song, M. (Summer, 2007). Effects of marketing-manufacturing integration on new product development time and competitive advantage. ***Journal of Supply Chain Management***.

Tan, K. C. (2001). A framework of supply chain management literature. ***European Journal of Purchasing and Supply Management*** 7 (1), 39-48.

Tayles, M. and Dury, C. (2001). Moving from make/buy to strategic sourcing the outsource decision process. ***Long Range Planning*** 34, 605-622.

Trent, R. J. and Monczka, R. M. (2002). Pursuing competitive advantage through integrated global sourcing. ***Academy of Management Executive*** 16 (2), 66-80.

Van Everdingen, Y., Van Hillegersberg, J., and Waarts, E. (2000). ERP adoption by European mid-sized companies. ***Communications of ACM*** 43 (4), 27-31.

Voss, C. and Blackmon, K. (1998). Differences in manufacturing strategy decisions between Japanese and Western manufacturing plants: the role of strategic time orientation. ***Journal of Operations Management*** 16 (2), 147-158.

Watts, C. A., Kim, K. Y., and Hahn, C. K. (1995). Linking Purchasing to corporate competitive strategy. ***International Journal of Purchasing and Materials Management***, Spring.

Weller, T. C. (2000). BtoB eCommerce, the rise of emarketplace. Equity research, Legg Mason Wood Walker.