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Suppliers' Participation in a Single Buyer Electronic Market

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Abstract Business to business (B2B) is the fastest growing segment of the explosive growth of e-commerce. The purpose of this study is to identify internal factors which influence the supplier's intention to adopt private exchange (PE), a single buyer side electronic market (EM). This study identified cost, flexibility, delivery, and quality as internal capabilities and investigated how these four factors influence suppliers' participation in PE. The results of the study indicate the following: (1) suppliers do not believe that their capability to produce customized products for customers plays an important role in PE; (2) they still believe that standardized rather than engineered products would dominate the marketplace; and (3) a contractible factor like lower price, rather than non-contractible factors including superior flexibility of production capability, fast and reliable delivery, and quality, plays an important role in the PE.

Keywords Private exchange · EDI · Value network · Internal capabilities · Adoption of electronic market

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1 Introduction

An explosive growth in business to business (B2B) electronic market (EM) has become a global trend. However, many B2B EMs are struggling to survive because they have failed to attract enough participants. Thus, it would be very meaningful to identify factors which influence suppliers' participation in EM.

Among many B2B EMs, this study focuses on private exchange (PE) since it currently forms the largest part of ecommerce (Laudon and Traver 2008). PE is a privately built EM by a single buyer who attracts many suppliers into the buyer's market. The main benefit of this model is that, if successfully implemented, the market helps both the buyer and sellers. This is because PE not only keeps the advantage of close offline relationships but also gives the benefit of on-line transactions. Since PE is one of the web-driven exchange models based on collaboration among partner firms, in addition to commercial transactions, participating firms can conduct business in the most effective way.

While it is important to understand what makes potential participants join EM, most studies have focused on the inter-organizational factors such as trust, dependency, subsidy expected from a partner, and the number of suppliers as factors influencing suppliers' adoption of electronic data interchange (EDI), the domain which is different from major B2B EMs like PE (Premkumar et al. 1994; Hart and Saunders 1997; Ramamurthy et al. 1999; Ratnasingam 2000; Chwelos et al. 2001; Teo et al. 2003; Lee and Lim 2007; Metters and Walton 2007; Son and Benbasat 2007).

There are commonalities between EDI and PE adoption. As both deal with suppliers participating in the buyers' network, the benefits that incur from the coordination between participants depend on the level of commitment on the system implementation (Hart and Saunders 1997). However, there are also many differences between them. The huge investment required in EDI, for instance, might not be a major issue in PE. Furthermore, the switching cost has decreased due to the high compatibility of the Internet technology. Additionally, while EDI leads to vertical information integration in the value chain by supporting simple and standardized data transactions (Mukhopadhyay et al. 1995), PE leads to horizontal collaboration in the value network by aligning intra- or inter-organizational business processes and IT infrastructures.

In the B2B PE environment, suppliers' primary concern has changed from inter-organizational factors to their internal capability since they do not expect their offline relationships with the buyer to be transferred to on-line relationships. Although previous studies on EDI adoption introduced perceived benefits as factor similar to internal capability, these studies focused not on suppliers' internal capability before EDI adoption but rather on their internal capabilities which are expected to improve after adopting EDI (Cragg and King 1993; Iacovou et al. 1995). Furthermore, it is common that EM adoption also focused on traditional EDI adoption factors rather than internal capabilities. Thus, this study intends to identify internal capability factors which influence the supplier's adoption of PE.

For the purpose of this research, we identified cost, flexibility, delivery, and quality as internal capabilities which influence suppliers' decision to participate in PE since; (1) they have played very important roles as order-winning criteria or order qualifying criteria and more importantly (2) the advanced IT also shifted the focus of

buyer–supplier relationships from contractible aspects like price and product specifications to non-contractible factors including quality, speed, and flexibility. Thus, this study investigates how these four factors are influencing suppliers' participation in PE, which supports horizontal collaboration between partners. In summary, the research question can be stated as follows: What are the internal capabilities that influence suppliers' adoption of PE?

2 Review of Relevant Literature

This section presents review of relevant literature on IT and inter-organizational relations (IORs). Section 1 presents review on the value network (VN), and Sect. 2 introduces and summarizes recent EM adoption literatures, while Sect. 3 discusses the characteristics of PE which is the domain of this study.

2.1 The Advent of Value Network

Since PE, the main domain of this study, is the product of value networked world, it is meaningful to study the meaning of VN. In virtue of high level of compatibility and connectivity of Internet based inter-organizational systems, we are moving into the value networked world. As we move from the world of the value chain (VC) to VN, we can expect significant changes to occur in terms of the relationships among business partners. Despite the importance of VN, there is no universally accepted definition of VN, as it has been defined differently by researchers according to the specific domain of their studies.

Weiner et al. (1997) introduced VN as a "whole new value chain," and maintained that VN is created when a company (1) focuses on high-profit, high-growth niches, (2) does not own all or even most of the assets in VC, and (3) prefers to configure only value-adding activities that are meaningful to the customer segment. According to their definition, a value networking company exploits the strength of each value provider and coordinates a production and delivery process across partners. They also defined the role of the leader in VN as choosing and assembling partners' capabilities to deliver value to a specific customer segment. They suggested a governance mechanism for VN including partnerships, alliances, joint ventures, specialized contracts, and outsourcing arrangement (Hines and McGowan 2005; Munoz and Welsh 2006).

Aldrich (1998) also noted that increasing complexity of digital products, which require a high degree of technical integration, enforces firms to forge pioneering partnerships with a wider range of suppliers and integrators to create VN. He maintained that organizations in VN engage in multiple two-way relationships to bring increasingly complex products and service to markets. Riches (2003) defined VN as an agile, adaptive, or virtual organization which is driven by the evolution of information and communication technology (ICT), globalization, and industry deconstruction. Organizations in VN focus on their core capabilities and are integrated with complementary partners to deliver customer value.

On the other hand, some scholars tried to define VN by focusing on the difference between VC and VN. Basole and Rouse (2008) insist that VC assumes a linear value

flow. Resource flows in dyadic relationships from raw material providers to manufacturers to suppliers to customers in VC. On the contrary, VN presumes multidirectional nature and complexities of a myriad of B2B, B2C, and C2C relationships. Thus, VN assumes the organization to be part of a larger network of organizations that collectively create value. VN is characterized by a complex web of direct and indirect ties between various participants. Basole and Rouse also emphasized the central role of ICT in reducing complexity for consumers by providing high levels of value network integration, information visibility, and means to manage and anticipate change.

Allee (2000) maintained that VC is rooted in an industrial age production line model and has been superseded by the new enterprise model of VN. He emphasized the importance of "reconfiguring a business from the VC organization to the more fluid structure of VN." He found differences between VC and VN in terms of the contents exchanged inside each model. For example, companies in a VC engage only in the exchange of goods, services, and revenue. On the other hand, those in a VN focus not only on exchange of goods, services, and revenue, but also on both knowledge and intangible benefits like customer community, which generates customer loyalty in return. The importance of intangible benefits can be more explained by the fact that increasing share of GDP has reflected the value of ideas more than material substance (Qureshi et al. 2006).

Fjeldstad and Haanæs (2001) approached the concept of VN by focusing on the types of value created in the network. They differentiated VN from VC according to the way the value is created. According to their definition, firms in VC create value by transforming inputs into more refined outputs. On the contrary, those in VN create value not through transformation of objects but through their mediation like stock exchange and telecom operators which connect people who want to communicate and transact. They suggested that the success of VN lies in whether it builds a club of members, which is large enough to complement each other based on the concept of positive network effect.

Stabell and Fjeldstad (1998) introduced the concept of VN as one of three generic value configurations, including: (1) the VC model which creates value through transformation of inputs into products; (2) the value shop model which creates value by mobilizing resources and activities to resolve a particular customer problem; and (3) the value network which creates value by facilitating a network relationship with customers using mediating technology. They insisted that main interactivity of VN is simultaneous and parallel compared to VC that requires a sequential relationship.

Copacino (1999) introduced meaningful trends including: (1) the cost of collaboration has declined, (2) the capital charge for a fully vertically integrated enterprise can be prohibitive, and (3) more companies focus on their core capabilities as main reasons for reversing the trend of vertical integration. Based on these assumptions, he insisted on the need for developing VN and defined it as a network in which organizations develop collaborative relationships with alliance partners that provide one of the core or infrastructure components of VC.

As a similar concept to the value network, Tapscott et al. (2000) introduced a concept called "b-web," which is defined as "a distinct systems of suppliers, distributors, commerce services providers, infrastructure providers, and customers that use the Internet for their primary business communications and transactions." They maintained

Table 1 Comparison of VN and VC

Authors	Focus	Value chain	Value network
Stabell and Fjeldstad (1998)	Value creation mechanism	Transformation of inputs into products	Facilitation of network relationship
	Type of interactivity	Sequential	Simultaneous and parallel
Copacino (1999)	Relationship	Vertically integrated	Horizontal collaboration
Allee (2000)	Contents of exchange	Goods, service, and revenue	Goods, service, and revenue
			Knowledge and intangible benefits like customer community
Fjeldstad and Haanæs (2001)	Value creation mechanism	Transformation of inputs into more refined outputs	Mediation of exchanges among partners
Weil et al. (2002)	Shape	Connected chain from suppliers to customers	Intersecting circles representing demand-side, internally focused and supply-side initiatives
Basole and Rouse (2008)	Type of inter-organizational relationships	Dyadic relationships	Complex web of direct and indirect ties between various participants

that an inter-networked fluid set of contributors cooperate to create value for customers and shareholders by focusing on a limited set of core competencies. Table 1 summarizes the discussion of VC and VN by selected studies.

As seen in Table 1, there are fundamental differences between VC and VN. Thus, we can expect there are meaningful differences between EDI, which focuses on vertical integration and is a by-product of the VC world, and PE which focuses on horizontal collaboration and is a by-product of the VN world in terms of the type of buyer–supplier relationships. This support the need to test the effect of internal capabilities of suppliers' adoption of PE rather than inter-organizational factors which were used as factors influencing EDI adoption.

2.2 EM Adoption

In spite of significant differences between EDI adoption and EM adoption in many aspects, most recent studies about EM adoption have still focused on traditional factors

Table 2 Summary of EM adoption literature

Authors	Focus	Factors identified
Jeon et al. (2006)	SMEs	CEO's knowledge of information technology (IT)/e-business
		Relative advantages and benefits from implementing e-business
		Governmental support
		Globalization strategy
Al-Qirim (2005)	SMEs	CEO's innovativeness and willingness to adopt EC
		Need to remain competitive
		Apparent compatibility of EC technologies
		Organizational size
Looi (2005)	SMEs	Competitive pressure
		IT knowledge
		Relative advantage
		Security
		Government support
Wu and Lee (2005)	All types	Customer pressure
		Normative pressure
Wymer and Regan (2005)	SME	Cost to set-up and maintain the system
		Effect of government rules and regulations
		Models of successful use
		Competitive pressure
Grandon and Pearson (2004)	SMEs	Organizational readiness
		Managerial productivity
		Decision aids
		Compatibility
		External pressure
Rask and Kragh (2004)	SMEs	External pressure (suppliers)
		Finding alternative suppliers (buyer)
		Efficiency of SCM (buyer)
Xu et al. (2004)	All types	Technology competence
		Enterprise integration
		Competition intensity
		Regulatory environment
Ihlstrom and Nisson (2003)	SMEs	Knowledge and awareness within the enterprises

which have been investigated in previous EDI adoption literatures as summarized in Table 2.

As seen in the Table 2, external factors such as competitive pressure, customer pressure, external pressure, competition intensity were the most common factors identified

in recent EM studies. These factors have been considered even in the JIT adoption literature (Group and Christy 1999). Senior managers' knowledge and awareness was also identified as an important factor. Contrary to our expectation, organizational readiness in terms of cost of implementation and maintenance was still an important prerequisite for EM adoption. However, it was very difficult to find any previous study which investigated firms' internal capabilities as motivators of EM adoption. Thus, it would be very meaningful to study the impact of organizations' internal capabilities on their adoption of EM.

2.3 PE for Collaboration

PE emerged as a new type of EM as inter-organizational collaboration becomes the norm for surviving and prospering in increasingly turbulent times (Ackerman et al. 2005), and organizations are disappointed with net marketplaces (O'Brien 2005). For instance, as of 2001, 70% of public exchanges either ceased their operations or modified their business models (McKinsey/CAPS Research 2001). Thus, PE eventually became the main B2B EM (Whitaker et al. 2001). Currently, PE constitutes about 75% of all B2B expenditures (Laudon and Traver 2008).

PE has "one-to-many IT platforms used to manage, monitor, and optimize value chain processes with key trading partners" (McKinsey/CAPS Research 2001). In some aspects, PE adoption is similar to EDI adoption since participation in PE requires suppliers to be integrated with the buyer's data management standard to maximize the level of collaboration among partners.

Among many types of PEs, this study focused on the single buyer oriented PE that is built by a single buyer such as Wal-Mart. Only a limited number of most trusted and valuable suppliers are invited to this market. PE focuses on value creation among partners whereas other EMs, such as public exchange, emphasize market liquidity and standardization of processes to increase the transaction-based revenue. The popularity of PE can be explained by the following reasons (Aron et al. 2008):

(1) Most importantly, deeper integration and collaboration of business processes can be fostered among traders
(2) Proprietary information is protected from competitors
(3) Competitive advantage is not disclosed and the firm's brand visibility is not lost

McKinsey/CAPS Research (2001) suggested PE to; (1) create real value for partners, (2) ensure senior management buy the vision of change, (3) partner with business unit managers to drive internal and external adoption, and (4) evolve the business model to meet the need of the business units to main the sustainability of PE.

In sum, PE is significantly different from other kinds of EM as its focus is on buyer–supplier relationships rather than on contractible aspects (Litz and Walker 2007), thus shifting strategic emphasis from price and product specifications to quality, speed, and flexibility.

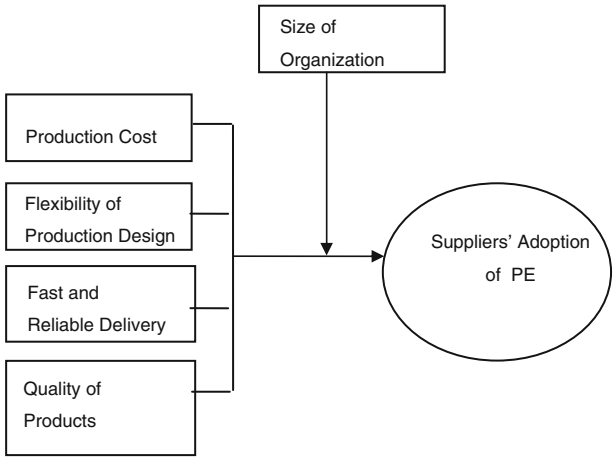

Fig. 1 Research framework

3 Research Design and Methodology

3.1 Research Framework and Variables

The purpose of this study is to identify suppliers' internal capabilities which influence suppliers' adoption of PE. Figure 1 presents the research framework.

This study measured suppliers' intention of adopting PE by using a single item and used it as the dependent variable. To control the influence of the size of organization, this study adopted organization size which is measured by the number of employees as a control variable. Independent variables consist of four types of capabilities which are measured in terms of (1) production cost, (2) flexibility of production capability, (3) fast and reliable delivery, and (4) quality of products as follows:

Step 1: Calculate the difference between the current level of each supplier's capabilities in terms of production cost and its expected importance as an order-winning criterion in PE. The negative numbers represent under capability, while the positive numbers represent over capability. Do the same for flexibility of production capacity, fast and reliable delivery, and quality of products.

Step 2: Add all the negative and positive scores to get the overall internal capability.

As explained above, this study measured the gap between suppliers' source of core competence and expected order winning criteria in PE and used the value as the suppliers' internal capabilities.

3.2 Hypotheses

To investigate the influence of suppliers' internal capabilities on their adoption of PE, this study developed a set of hypotheses by focusing on four kinds of capabilities

introduced above. The hypotheses focus on the perceived strengths or weaknesses that suppliers expect when they join PE. For this purpose, the hypotheses will test the relationship between "suppliers' internal capabilities" and their intention of joining PE.

As explained in the previous section, this study focuses on suppliers' internal capabilities in terms of four factors including cost, flexibility, delivery, and quality since they have been known as order winning criteria or order qualifiers (Miller and Roth 1994; Vastag and Narasimhan 1998), and their importance has been changed significantly since the advent of the Internet era. Moreover, development of information technology (IT) has moved the focus of the buyer–supplier relationship from a contractible aspect to non-contractible aspects as discussed earlier. Thus, it will be very meaningful to identify what kinds of capabilities really influence a supplier's intention of joining PE.

Since the sample firms of this study are small and medium sized manufacturing organizations that supply electronic parts for a global manufacturing firm, which produces electronic products, this study adopted the issue of congruence from the domain of manufacturing to measure capabilities. Vastag and Narasimhan (1998) insisted that the focus of firms' manufacturing practice should be strongly related to performance measures including cost, flexibility, delivery, and quality. Challis et al.'s (2002) study also proved a positive relationship between the focus of manufacturing practice and firms' measurable performance. Thus, this study assumes that a supplier's area of core competence reflects the current focus of its manufacturing practice. This study also assumes that the expected order winning criteria in PE should indicate the focus of the manufacturing strategy, which will lead the focus to future manufacturing practice.

Miller and Roth (1994) argued that core competencies such as cost, flexibility, delivery, and quality should be related to corporate strategy, which includes manufacturing strategy as a subordinate function (Wheelen and Hunger 1983). Vastag and Narasimhan (1998) emphasized the importance of the congruence between manufacturing practices and manufacturing strategy. Skinner (1978) also maintained that organizations that have congruence are superior to those without in terms of firm performance.

Iacovou et al. (1995) suggested that the supplier's adoption of EDI is influenced by opportunities for increased ability to compete by providing better service at a lower price. Those which have competed on quality and long-term relationships hesitated to adopt EDI since they believed that their source of strength might be lost in the new environment. As shown in Fig. 2, the result of their study implies that a supplier's current source of core competence can also be a source of order winning criteria in PE and thus a major adoption factor for PE.

This study posits that the relationship between suppliers' capability and their intention of adopting PE varies according to different kinds of internal capabilities. For example, suppliers with high internal capability in terms of production cost tend to have the intention of joining PE since they still believe they need to compete mainly on the price. On the other hand, suppliers with high capability in terms of flexibility, delivery, and quality will show a low level of intention of joining PE since they do not believe their capability in these areas will play an important role as order winning criteria in PE. Thus, the following hypotheses are developed (See Fig. 2).

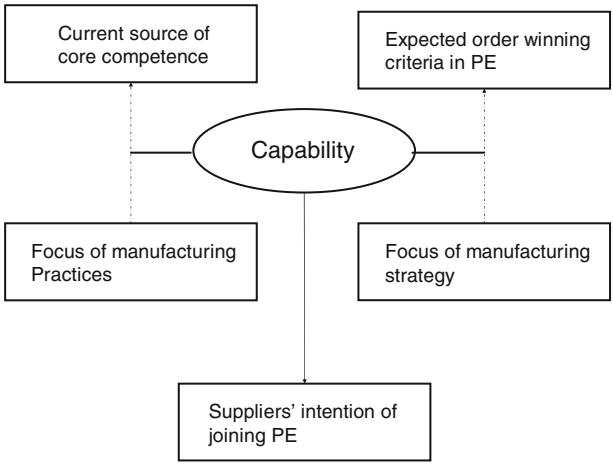

Fig. 2 Research model

H1 The greater the level of capabilities in terms of production cost, the higher the intention of suppliers to join PE.
H2 The greater the level of capability in terms of flexibility of production capability, the lower the intention of suppliers to join PE.
H3 The greater the level of capabilities in terms of reliable and fast delivery, the lower the intention of suppliers to join PE.
H4 The greater the level of capabilities in terms of the quality of products, the lower the intention of suppliers to join PE.

3.3 Research Methodology

3.3.1 Sample and Data Collection

This study is intended to investigate the relationships between the suppliers' intention of joining PE and the internal capabilities that are expected to influence suppliers' intention. This study addressed the dynamic aspect of suppliers' internal capabilities which are assumed to be significantly influenced by advanced IT. A total of 400 suppliers of a single buyer, a major IT firm which was recently ranked as one of the top five IT firms in the world (Business Week 2004) and one of the top 25 global brands (Business Week 2005), were selected as a sample group. Thus, the unit of analysis of this study is the organization.

The questionnaires were sent to the marketing manager or the highest-ranking officer in charge of the marketing function who has the overall understanding of and responsibility for the organization's relationship with the buyer and the firm's internal capability.

3.3.2 Instrument Design

To develop the questionnaire, interviews with practitioners were conducted to identify potential factors influencing suppliers' participation in PE. Also, a thorough review

of previous literature on the related areas including (1) EDI adoption, (2) electronic markets, (3) IT and inter-organizational relationships, and (4) changes incurred by the Internet technology, was conducted to identify factors.

By aggregating the results from both interviews and literature reviews, the first draft of the questionnaire measuring (1) the characteristics of the suppliers, (2) suppliers' perception of PE, and (3) suppliers' market position were developed. Then, the questionnaire was significantly revised through three pilot tests (40 questionnaires for each test) using the suppliers in the same industry. The final versions of the questionnaires were distributed to the sample group.

3.3.3 Statistical Tools

To investigate the relationships between suppliers' intention of joining PE and their internal capabilities, various statistical tools are employed for this study. First, multiple regression analyses were employed to identify which capabilities actually influence suppliers' intention to adopt PE. Second, suppliers were separated into two groups, according to their level of four kinds of capabilities and that of the overall capability. Then, five independent sample *t*-tests were conducted to differentiate the two groups by comparing the mean scores of their intention to adopt PE. SPSS 12.0 was used for analyses.

4 Result and Discussion

4.1 Analysis of Data

Of the 400 questionnaires distributed, 113 usable responses were received. Twenty-one questionnaires were returned to the researchers due to one of the following postal service explanations: (1) The address was wrong, (2) the firm was no longer in existence, or (3) the firm had moved. Excluding the returned questionnaires due to wrong addresses, the response rate was 28.25%.

Tables 3 and 4 show the demographic characteristics of responding organizations. The size of the organization is illustrated by the number of employees. The average

Table 3 Number of employees

Employees	Frequency	Percent	Cumulative percent
9 or less	13	11.7	11.7
49 or less	17	15.3	27.0
99 or less	19	17.1	44.1
499 or less	53	47.7	91.9
999 or less	5	4.5	96.4
1000 or more	4	3.6	100.0
Total[a]	111	100.0	

[a] Two organizations did not indicate the number of employees

Table 4 Type of business

	Frequency	Valid percent	Cumulative percent
Electric, electronics	78	69.6	69.6
Metal, machine	11	9.9	79.5
Other	23	20.5	100
Total[a]	112	100.0	

[a] One organization did not respond to this question

number of employees of responding organization was 198. Table 3 summarizes the distribution of the responding organization size represented by specific ranges. The result indicates that most of the responding organizations are SMEs.

When it comes to the relationship with buyers, the average length of the relationship between the responding organization and the buyer is 12.49 years, and the average number of main buyers of responding organizations is 13.94.

Table 4 represents the business type of the responding organizations. Since the sample group consists of suppliers of a global IT firm, 69.6% of respondents are classified as manufacturers of electric or electronic products.

4.2 Hypotheses Test

Multiple regression analysis was conducted to test hypotheses developed for this study. Then, the suppliers were separated into two groups: (1) those with higher levels of intention to join PE, and (2) those with lower levels of intention. Next, independent sample t-tests were conducted to identify which factors really differentiate these two groups.

Multiple regression analysis was also conducted to identify the suppliers' internal capabilities that influence their intention of joining PE. As shown in Table 6, four factors including (1) production cost, (2) flexibility of production capability, (3) reliable and fast delivery, and (4) quality of product were used as independent variables. The size of the organization was used as a control variable since it has been identified as a significant factor influencing firms' adoption of e-Business (Levenburg 2005; Al-Qirim 2005). The dependent variable is the suppliers' intention of adopting PE.

Table 5 shows the extracted model, which explains about 10% of total variance. P value (.064) in ANOVA statistics in the table shows the model is significant at the α-level of 0.1.

Tolerance scores in Table 6 show that a multi-colinearity problem can be ignored since all the tolerance scores are greater than .01 (Pedhazur 1997). The Dubin Watson coefficient for the auto-correlation problem was not checked since the data is not a time series one. The coefficient scores in Table 7 show the flexibility of production capability was identified as a major factor influencing suppliers' intention of joining PE. The result indicates that there is a negative relationship between the suppliers' intention and capability in terms of production flexibility. This means that the higher the capability in terms of flexibility, the lower the suppliers' intention to join PE.

Table 5 Model summary and ANOVA statistics

Model	*R*	*R* square	Adjusted *R* square		Std. error	
	.312	.098	.052		.801	
		Sum of squares	df	Mean square	*F*	Sig.
1	Regression	6.935	5	1.387	3.065	.064
	Residual	64.169	100	.642		
	Total	71.104	105			

Table 6 Regression model results

Model		Unstandardized coefficients		Standardized coefficients	*t*	Sig.	Collinearity statistics
		B	Std. error	Beta			Tolerance
1	Constant	3.382	.105		32.300	.000	
	Cost	.047	.061	.079	.781	.437	.837
	Flexibility	−.156	.070	−.251	−2.236	.028	.896
	Delivery	−.094	.080	−.139	−1.178	.242	.711
	Quality	.020	.092	.028	.219	.827	.554
	Size	−9.486E-0.5	.000	−.033	−.339	.735	.806

Table 7 Result of hypotheses test

Hypotheses	Factors	Results
H1	Production cost	Not supported
H2	Flexibility of production capability	*Supported*
H3	Fast and reliable delivery	Not supported
H4	Quality of products	Not supported

The result of the hypotheses tests is summarized as seen in Table 7.

To check the individual effect of each type of capability, five *t*-tests on four kinds of capabilities and an overall capability were conducted. First, the group was separated into two groups for each *t*-test by using the mean score of each capability as a cut-off point between the two groups. Thus, group one consisted of suppliers with the lower 50% of capability and group two, those with the higher 50% of capability. As seen in Table 8, there are significant differences between the two groups in terms of flexibility and delivery. These results imply that: (1) the greater the flexibility of production capability, the lower the intention of suppliers to join PE; and (2) the greater the delivery capability, the lower the suppliers' intention to join PE. Although the results were not statistically significant, *t*-test on the two groups separated by quality also showed the same trend as flexibility. The results from the additional *t*-test analyses also strongly support the result of the hypotheses test.

Table 8 Result of the *t*-test

	Group by capability	*N*	Mean	Std. deviation	*P* value
Cost	Low	40	3.1500	1.02657	.374
	High	70	3.3143	.71308	
Flexibility	Low	56	3.4643	.68661	.002
	High	52	2.9808	.89641	
Delivery	Low	56	3.3929	.73059	.080
	High	54	2.1111	.92485	
Quality	Low	51	3.3529	.74360	.248
	High	59	3.1695	.91260	

4.3 Discussion

The results of this study imply that suppliers with competitive advantage in terms of non-contractible aspects like flexibility and delivery hesitate to join PE since they believe their source of strengths would not play important roles in the new market.

Among the four factors analyzed, the flexibility of production capability plays a very important role. The negative coefficient in the multiple regression analysis supports the second hypothesis of this study that "The greater the level of capability in terms of flexibility of production capability, the lower the intention of suppliers to join PE." The result implies: (1) suppliers do not believe that their capability to produce customized products for customers will play an important role in PE; and (2) they still believe that standardized rather than engineered products still dominate the marketplace.

Another negative relationship was identified between suppliers' capability in terms of a reliable and fast delivery and their intention to join PE, although the P-value is a bit higher ($P < 0.1$) than a statistically significant value. This result means that suppliers do not believe that their capability in terms of reliable and fast delivery will play an important role in PE.

On the other hand, a positive relationship was identified between suppliers' capability in terms of production cost and their intention to join PE as this study hypothesized. Even though this result was not statistically significant, it deserves our attention since it supports that suppliers still regards PE as a marketplace where many suppliers have to compete based on the price.

Suppliers' capability in terms of quality of products showed neither positive nor negative relationship with their intention to join PE. This result implies that some suppliers believe that the focus of EM will shift from a contactable aspect like the price of products to non-contractible factors like quality of products, by virtue of advanced information systems, while other suppliers still believe that only price of products will play an important role in the EM. Also, size of the organization had no impact on suppliers' intention to join PE.

5 Conclusions

The purpose of this study is to identify internal capability factors which influence the supplier's decision to join PE. For this purpose, this study identified price, flexibility, delivery, and quality as internal capabilities. The results of this study showed that suppliers still believe that contractible aspects rather than non-contractible areas play important roles even in the new type of EM. Especially, the result indicated that the flexibility of production capability plays a very important role in suppliers' decision to join PE and suppliers still believe that standardized rather than engineered products will dominate the PE marketplace.

In sum, the result of statistical analyses suggest that suppliers still believe that PE is a price based marketplace where lower price rather than non-contractible areas such as superior flexibility of production capability, fast and reliable delivery, and quality play important roles as order winning criteria. Thus, buyers need to convince their suppliers that PE is a new marketplace where not only price but also other non-contractible factors play important roles as order winning criteria.

Because this study is based on a survey method to test a set of developed hypotheses, it has some limitations related to research processes. First, it was not easy for the respondents to clearly understand what the fundamental difference is between PE and other kinds of electronic markets, even though the characteristics of PE are clearly described in the questionnaire. Thus, it would have been meaningful if the data were collected through direct interviews with each supplier. However, it was not possible as the unit of analysis is the organization (the supplier) and the required sample size is simply too large in terms of cost, time, and available human resource to conduct the study.

Second, all the respondents are suppliers of a single global IT firm. Thus, the result of this study has a limitation in terms of external validity. This means that the result of this study might not be applied to other industries since each industry has its own unique context and business environment. Third, the result of this study could vary according to different cultural and economic environments. For example, different sets of factors might be identified according to geographical locations of each sample group, even if the sample groups are from the same industry.

Implication for future study can be derived from our study. First, this study concluded that buyers need to convince their suppliers that PE is not solely about price competition. This strongly indicates that there is a high degree of uncertainty regarding its effects on the existing relationships and capabilities. Thus, conducting longitudinal studies focusing on the changes in terms of these factors before and after PE adoption will be meaningful. Second, the same research model can be applied to different industry sectors such as service business to improve external validity of the model.

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