WHAT DRIVES ENTERPRISES TO TRADING VIA B2B E-MARKETPLACES?

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ABSTRACT

Rapid developments in e-commerce and e-technology have accelerated intra-business and inter-business online transactions during recent years. Following an empirical survey, critical factors influencing a firm's willingness to use an e-marketplace are identified via a pre-joining, decision to join, and post-joining research structure. The differences between companies participating and not-participating in e-marketplaces are also examined. However, owing to the samples being limited to Taiwanese enterprises, cautious is needed in generalizing the findings of this study to other countries with different cultures or industry structures.

Keywords: B2B E-Marketplace, Electronic Marketplace, Web-Based Services

1. Introduction

Given the explosive growth in Internet-based technologies and e-commerce, a growing number of brick-and-mortar trading activities have moved to the Internet, and are typically conducted via web-based systems called e-marketplaces that enable automated transactions and collaboration between buyers and sellers. According to the e-Marketer [2004], total e-commerce in the business-to-business (B2B) sector exceeded US\$ 2.77 trillion in 2003 whereas e-commerce in the business-to-customer (B2C) sector reached US\$ 0.452 trillion in 2003. E-Marketer [2004] also reported that North America accounted for US\$ 1.6 trillion of the US\$ 2.77 trillion B2B e-commerce market, with the remainder being comprised as follows: Asia-Pacific, US\$ 0.3 trillion, Europe, US\$ 0.8 trillion, Latin America , US\$ 0.58 trillion, and Africa and the Middle East together accounting for US\$ 0.177 trillion. The market intelligent center (MIC) based in Taiwan [MIC, 2004] reported that the value of e-marketplace transactions in Taiwan exploded between 2000 and 2003 (recording US\$ 56 million in 2000, US\$ 125 million in 2001, US\$ 406 million in 2002, and US\$ 750 million in 2003). By 2007, 50% of B2B e-commerce in Taiwan will be transacted through e-marketplaces, compared to an average of 55% of B2B e-commerce worldwide via e-marketplaces, according to Internet Data Center (IDC) Report [IDC 2005].

Metcalfe et al. [2002] predicted that US firms would shift 42% of online trading to e-marketplaces in the next five years and lead trading in e-marketplaces in the US to exceed US\$ 3 trillion in 2006, while European B2B e-marketplace are expected to top US\$ 2.8 trillion in 2006. Jupiter Research [2002] estimated that B2B e-marketplaces accounted for 3% of global trade in 2000, and predicted this would reach 36% in 2005. Furthermore, Gartner Group Report [Gartner 2003] estimated that e-marketplaces would transact US\$ 7.3 trillion of global trade in 2007. Although the e-marketplace has experienced the up and down of its rollercoaster ride in the beginning period, its future seems prosperous as projected by many industries and academic institutes. Moreover, e-commerce figures may vary subject to survey time and calculation formulas, but the clear trend is for B2B e-commerce to significantly exceed B2C e-commerce, and for e-marketplaces to contribute significantly to B2B e-commerce growth.

Unlike most e-marketplace studies [Bakos 1991&1998; Kalakota & Whinston 1997; Leebaert 1998; Clemons & Wang 2000; Koch 2002; Yu 2003; Fairchild et al. 2004] which utilize the e-marketplace business perspective to explore – how e-marketplaces emerged, their development, role, and classification, major phases of in building an e-marketplace, the key factors contributing to the success of e-marketplaces, e-marketplace competitive strategies' analysis and evaluation, and so on, this investigation aims to understand the causes driving companies to participate in e-marketplaces from the perspective of e-marketplace participants. Furthermore, as Rash and Kragh [2004] noted, the current literature not yet explored in detail the motives relating to e-marketplace participation and non-participation. This study attempts to comprehensively explore the factors driving enterprise decisions regarding whether to conduct business via e-marketplaces. Although rapid growth in e-marketplaces seems inevitable, a survey taken in early 2004 [Yu, 2006] revealed that the rate at which Taiwanese small- and medium-sized enterprises join e-marketplaces was significantly below expectations. Therefore, this investigation also attempts to understand the e-marketplace adoption rate among large Taiwanese firms and to perform cluster analysis to find differences between firms that use e-marketplaces and those that do not.

2. Literature Review

Regarding the motivations driving enterprises to use e-marketplaces, the prevailing literature [Bakos 1991& 1997&1998; Gebauer 1999; Afuah & Tucci 2001; Raisinghani & Hanebeck 2002; Ratnasingam et al. 2005; Yu 2006] has mostly considered economic incentives such as reducing the search costs that buyers incur when sourcing suitable products, collecting product data, and comparing prices, and reducing the marketing cost that sellers incur when attempting to attract prospective customers, launch new products or promote old ones, and run advertising campaign. Although most literature has argued that e-marketplaces affect the market power of buyers and sellers and generally favor buyers since e-marketplaces eliminate search product information and price barriers, some studies [Lee 1998; Strader & Shaw 1999; Grover & Ramanlal 2000] have different findings. In a study of the Japanese auto-auction market, Lee [1998] found that prices of used cars traded through e-marketplaces are higher than those of used cars traded in traditional markets because sellers can preserve their asking prices while being able to expose their products to a wider range of buyers. The implication driven from this case is that the reduced price hypothesis stands only when sellers exceed buyers. In an empirical study of the sports trading card market, Strader and Shaw [1999] observed that prices, search costs, and sales taxes are lower in e-marketplaces, while risk costs, distribution costs, and market costs are lower in traditional markets. The resulting implication is that either sellers or buyers may try to delay e-marketplace adoption as long as they cannot benefit from e-marketplaces. Through examining the worst-case and best-case scenarios, Grover and Ramandal [2000] demonstrated that technology provides buyers with advantages in searching products and comparing offering, while also allow sellers to benefits from increased numbers of buyers, reduced marginal costs, price discrimination, and information manipulation. For a market maker, to benefit both buyers and sellers rather than favor either one is the best strategy for promoting the growth of e-marketplaces.

Besides the perspective of economics, recent articles [Sodhi 2001; Skjott-Larsen et al. 2003; Lu & Antony 2003; White & Daniel 2004] have attributed e-marketplace adoption to the rapid development of Internet-enabled supply chain. Faloon [2000] and Grieger [2003] noted that e-marketplaces emerge in different industries, supporting different forms of exchange of goods and services, involving different types of actors, and reducing the transaction and operating costs inherent in supply chains. Moreover, Sodhi [2001] commented that by expanding the physical scope of marketplaces, including vendors and customers, and functional scope of marketplaces, including product design, marketing, and customer relationship management, e-marketplaces significantly increase the efficiency of Internet-enabled supply chains. Based on an extensive literature review, Skjott-Larsen et al. [2003] argued that different types of buyer-supplier relationships require different types of e-marketplaces. Through conducting an empirical investigation in the UK, White and Daniel [2004] found that the reasons motivating sellers to use e-marketplaces included: a defensive strategy against other e-marketplaces established by rivals, providing a single point of contact and communication with numerous customers, and perceiving the potential to reduce order-processing costs. The main reasons for buyers to use e-marketplaces include: reducing the cost and time required for purchase, ease of comparison of products from a range of suppliers, and access to many suppliers via a single point of contact. Notably, White and Daniel [2004] also found that the adoption of e-marketplaces has led to a deepening of buyer-supplier relationships, a finding that is consistent with studies of Malone et al. [1987] and Clemons et al. [1993].

Generally, e-marketplaces can be classified into vertical and horizontal markets depending on industry specification, or direct and indirect markets depending on the product nature. Classifying e-marketplaces according to the role of the owner, three types of e-marketplaces can be identified: buyer-driven, seller-driven, and independent e-marketplaces. Among these, the first two groups of e-marketplaces are also called participant-owned e-marketplaces. Buyer-driven e-marketplaces are established by consortiums of buyers interested in procuring products from upstream suppliers via the Internet, while sell-driven e-marketplaces are established by consortiums of suppliers interested in selling products to their downstream via the Internet. Meanwhile, independent e-marketplaces are those established by third parties (called pure players or market makers) who are neutral and simply attempt to generate revenues by operating the marketplace on behalf of traders. Since classifications of e-marketplaces vary according to the differentiating criteria used, the following table summarizes different classification schemes:

As Grewal et al. [2001] pointed out, the success of e-marketplaces depends not only on the market makers (e-marketplaces) but also on market participants (called user firms). Therefore, this study focuses on the perspective of user firms (market participants) instead of that of e-marketplaces (market makers) to explore what drives enterprises to trade via e-marketplaces. Besides, extant literature lacks of investigating the differences regarding firm decisions to use an e-marketplace between pre-adoption and post-adoption. Accordingly, this wok adopts the pre-joining, decision to join, and post-joining research structure to investigate the critical factors driving a firm to participate in an e-marketplace.

Separating Criteria	# of type	Type Name	Resources	
Industry specification	two	vertical and horizontal markets		
Product nature	two	direct and indirect markets	Pairch [2000]	
Role of the owner	three	buyer-driven, seller-driven, and independent e-marketplaces	Kuisen [2000]	
How businesses buy and what businesses buy	four	MRO (Maintenance, Repair, Operation) Hubs, Catalog Hubs, Yield Managers, and Exchanges	Kaplan & Sawhney [2000]	
Level of automation and Impact of pricing models	four	Commerce Hub, Dynamic Marketplace, Channel Enabler, and Content/Community Portal	Piccinelli et al. [2001]	
Matching mechanism	chanism five aggregators, trading hubs, post and browse markets, auction markets, and fully automated exchanges		Sculley & Woods [2001]	
The position in the value chain	two	biased vs. unbiased	Grewal et al. [2001]	
Trading partners	Trading partners two static vs. dynamic or established vs. discovered		Gottschalk and	
Market focus	four	spot markets, open markets, private markets, and information markets	Abrahamsen [2002]	

Table 1: Scheme of e-marketplace classification

3. Determinants for E-marketplace Adoption

Numerous studies have contended that e-marketplaces evolved from electronic data interchange (EDI) systems and developed based on e-procurement needs [Angeles 2000] and fully supported by IT, IS, and communication technologies [Guilherme & Aisbett 2003]. Hence, possible determinants of affecting a firm's likelihood of adopting an e-marketplace can be referred in literature: e-procurement [O' Callaghan et al. 1992; Aisbett et al. 2005]; EDI [Iacovou et al. 1995; Premkumar et al. 1994; Angeles 2000; Chau 2001]; IT [Davis 1993; Karahanna et al. 1999]; IS [Thong 1999; Gefen & Straub 2000]; e-commerce [Poon & Swatman 1999; Kendall et al. 2001; Travica 2002]; telecommunication [Grover & Goslar 1993; Pollard 2003]; and Internet-related technologies [Slade & Van Akkeren 2002; King & Gribbins 2003].

O' Callaghan et al. [1992] examined the factors affecting a firm's decision on whether to adopt an e-procurement system, and presented three principal questions. First, can e-procurement system provide the required functionality with the enhancement of the company competitive needs? This is a primary product criterion affecting the adoption decision. Second, is e-procurement system compatible with the existing IS, corporate cultural/value and current procurement workflow? The primary internal factors behind this question are that investment required in new infrastructure, effort required in integrating with existing IS, and change required in current workflows and/or organization structure positively impact a firm's decision to adopt an electronic procurement system. Third, in addition to these factors, adoption by principal customers within a supply chain or by other important companies in the same industry and incentive from government or regulations are primary external factors that impact a firm decision to adopt an e-procurement system.

Consequently, four potential factors exist when a firm decides whether to join e-marketplaces.

F1. Willingness to use e-marketplaces is influenced by whether the required trade functionality is fully supported.

F2: Willingness to use e-marketplaces is affected by the degree of compatibility for transforming current buying and selling activities into online buying and selling via e-marketplaces.

F3: Willingness to use e-marketplaces is likely if key customers within a supply chain or competitors in the same industry adopt e-marketplaces.

F4: Willingness to use e-marketplaces is influenced by government measures encouraging businesses to adopt e-marketplaces.

Grover and Goslar [1993] examined 15 different information exchange technologies (i.e., bulletin boards, email, integrated service digital network, etc.) and studied the corporate reasons for using or failing to use these technologies. After examining the influences at three phases of start-up, adoption and execution, the crucial factors influencing company adoption of new technologies were as follows:

(1) Stability of a competitive environment is a critical factor affecting a company's decision to adopt/not adopt

new technologies. If a competitive environment is complex and volatile, then a firm is likely required to innovate when adopting new technologies to maintain its competitive edge. Conversely, a firm is unlikely to adopt innovative new technologies when a stable competitive environment exists.

- (2) Company size also affects company decisions regarding adoption of new technologies. Large companies are typically better equipped than small companies to adapt to changes, possess the resources needed to accommodate change and are better capable of handling the risks related to adopting new technologies to boost competitiveness.
- (3) If a company's decision-making team is dispersed globally rather than centrally located, then the company is more likely to adopt new technologies to enhance information flow.
- (4) Extent of standardization and documentation in a company's workflow also influence the likelihood of a company adopting new technology; this likelihood increases if company workflow is highly standardized and well documented.
- (5) Companies with well established IS are frequently willing or ready to adopt new technologies. Measures of IS maturity are the extent to which a company's workflow is digitized, sophistication of system infrastructure, performance of IS (dependent on whether an organization's goal was met, not on cost), the degree of IS standardization, the senior management's commitment to implementing IS and the number of IT-experience employees in a company.

Thus, five possible factors affecting whether a company chooses to utilize e-marketplaces are as follows:

F5. Willingness to use an e-marketplace is affected by competitive environment stability.

F6: Willingness to use an e-marketplace is influenced by company scale.

F7: Willingness to use an e-marketplace is influenced by the degree to which a company is global.

F8: Willingness to use an e-marketplace is affected by the degree of workflow standardization, documentation, and computerization.

F9: Willingness to use an e-marketplace is influenced by the ease of using an e-marketplace to conduct current operations.

Premkumar et al. [1994] surveyed 201 firms that had implemented EDI and Premkumar and Roberts [1999] interviewed 78 businesses that adopted new information communication technology. The following conclusions are drawn from their studies. (1) The extent of new system/technology compatibility with a company's existing workflow, work values and past work experience – result in a high level of compatibility, suggesting a high chance of adoption. (2) A high level of difficulty of using new system/technology and training decreases the likelihood of adopting new system/technology. (3) Low installation costs increase the likelihood of adopting new system/technology. (4) Support from senior management increases the chance of adopting new system/technology. (5) If potential benefits by using new system/technology are high, then the likelihood of adoption is correspondingly high. (6) When substantial competitive advantage can be gained from new system/technology, the chance that a firm adopts such system/technology is high.

Deducting similar findings in F2 (compatibility) and F9 (ease of use), two additional critical factors influencing firm use of e-marketplaces are as follows:

F10. Willingness to use e-marketplaces is influenced by the competitive advantages a firm can gain from their use.

F11. Willingness to use e-marketplaces is affected by the strength of support from senior management.

Based on surveys of 166 businesses analyzing company decisions in adopting new IS/IT, Thong et al. [1995] and Thong [1999] discovered eight critical factors. (1) The character of a CEO (e.g. innovative or conservative, risk averse or risk friendly) highly impacts a company's decision to adopt new IS/IT. (2) A CEO's awareness of new IS/IT (e.g. knowledge of new IS/IT, aware of potential benefits derived from adopting new IS/IT, etc.). When a CEO that is aware of and understands new IS/IT, the company will be likely to use such IS/IT. (3) If a new IS/IT provides a competitive edge required by a firm or matches a firm's goal, the company is likely to utilize new IS/IT. (4) The degree of compatibility of new IS/IT with a company's existing workflow and systems is positively correlated with a firm's likelihood to adopt new IS/IT. (5) If new IS/IT is considered complex and difficult to use and understand, the chances of it being adopted is low. (6) A large company is more likely than a small company to adopt new IS/IT. (7) If employee knowledge of new IS/IT is low, then the company is likely to be slow in adopting such IS/IT. (8) If a company is dependent on the accuracy, speed and reliability in information exchange, then it usually keeps an eye on new IS/IT launching and likely to adopt new IS/IT.

Based on similar findings, such as F10 (competitiveness and relative advantages), F2 (compatibility), F9 (ease of use) and F6 (firm scale), two other possible determinants for utilizing e-marketplaces are as follows:

F12. Willingness to use e-marketplaces is influenced by promotion from CEOs.

F13: Willingness to use e-marketplaces is influenced by the speed of completing a transaction and exchanging

trading information.

Lai [1998], who examined the adoption and execution of e-store strategies by Taiwanese companies, identified the following eight issues that affect a firm's decision to construct/not construct electronic stores: buy in and adoption by senior management, professional awareness of electronic markets by senior management, the extent of computerization in the company, supply chain customer requirements, cost of adoption, cost of management and maintenance, the quality of data transmission and network security, the extent of collaboration between network suppliers and customers, and the support provided by network suppliers to customers.

Deducting findings similar to F11 (support from senior management), F8 (workflow computerization) and F3 (peer influence), two possible influences on the utilization of e-marketplaces are as follows:

F14: Willingness to use e-marketplaces is influenced by service quality and security level provided by e-marketplaces.

F15: Willingness to use e-marketplaces is influenced by the added value offered by e-marketplaces.

Based on 65 organizations, Gottschalk and Abrahamsen [2002] reported that top three reasons for firms not joining e-marketplaces are that e-marketplaces were not relevant for their businesses, their customers were not ready, and that integrating e-marketplaces with existing systems was too difficult. Conversely, the top four reasons for firms joining e-marketplaces are reducing transaction costs, negotiating better agreements, better utilizing frame agreements, and accessing more suppliers. These findings are similar to F2 (compatibility), F3 (peer influence), and F10 (competitiveness and relative advantages). Lee and Lim [2005], Driedonks et al. [2005], Molla and Licker [2005], Wu and Wang [2005], and Yu [2006], who published the most recent studies on the adoption of EDI/e-marketplaces/e-commerce/mobile commerce, did not identify any critical factors beyond F1-F15.

4. Building Research Structure, Hypotheses, and Questionnaires

Building on the previous discussion, determinants of e-marketplace use can be deconstructed into four constructs. Construct 1 circumscribes "firm characteristics" - degree of compatibility for moving current transaction activities to e-marketplaces (F2), company scale (F6), degree of globalization (F7), degree of workflow standardization, documentation, and computerization (F8), and speed requirement for completing a transaction and exchanging information (F13). Construct 2 is "competitiveness of the business environment", which involves concerns from principal customers within the supply chain or important competitors (F3), government encouragement (F4), and degree of stability within the competitive environment (F5). Construct 3 is "promotion from top management" primarily consisting of senior management (F11) and CEO (F12). Construct 4 is "the e-marketplace itself" including level of required functional fulfillment (F1), level of ease using e-marketplaces (F9), competitive advantages brought by using e-marketplaces (F10), degree of service quality and security supported by an e-marketplace (F14), and required cost for joining an e-marketplace (F15).

Based on the research goal of considering e-marketplace participants rather than e-marketplace itself business, this work utilizes constructs 1-3 to exploring what drives firms to use e-marketplaces, and takes an entire firm (user firm) as the survey unit. The research structure includes three models, namely pre-adoption, in-adoption, and post-adoption, as depicted in Fig. 1.

From Figure 1, the nine hypotheses were stated as follows:

For e-marketplace in-adoption stage (Model 1),

- H1: Firm characteristics significantly influence firm decision to utilize e-marketplaces;
- H2: Competitiveness of the business environment significantly influences firm decision to utilize e-marketplaces;
- H3: Promotion from top management significantly influences firm decision to utilize e-marketplaces.

For e-marketplace pre-adoption stage (Model 2),

H4: Firm characteristics significantly influence firm decision to begin planning to adopt e-marketplaces;

- H5: Competitiveness of the business environment significantly influences firm decision to begin planning to adopt e-marketplaces;
- H6: Promotion from top management significantly influences firm decision to begin planning to adopt e-marketplaces.

For e-marketplace post-adoption stage (Model 3),

H7: Firm characteristics significantly influence the likelihood of a firm continuing to utilize e-marketplaces;

- H8:Competitiveness of the business environment significantly influences the likelihood of a firm continuing to utilize e-marketplaces;
- H9: Promotion from top management significantly influences the likelihood of a firm continuing to utilize e-marketplaces.







Figure 1: Research structure

The operational definition for each construct and multiple-items scales drawn from literature to measure constructs 1-3 are shown in Table 2.

Construct	Corresponding critical factors	Operational Definition	Corresponding Questionnaire Items	Item Sources
Firm characteristics	F2, F6, F7, F8, F13	The degree of demands from the inside company to push a firm to adopting an e-marketplace	Q1-12	[O' Callaghan et al. 1992; Grover & Goslar 1993; Thong et al. 1995; Thong 1999; Gottschalk & Abrahamsen, 2002]
Competitiveness of the business environment	F3, F4, F5	The degree of stress from the outside company to pull a firm to adopting an e-marketplace	Q13-25	[O' Callaghan et al. 1992; Grover & Goslar 1993; Gottschalk & Abrahamsen 2002]
Promotion from top management	F11, F12	The degree of supporting a firm to adopt an e-marketplace from the CEO or senior management e-savvy	Q26-37	[Premkumar et al. 1994; Premkumar & Roberts 1999; Thong et al. 1995; Thong 1999]

The questionnaire comprises two sections as listed in Appendix A. The first section contains 37 questions used to solicit company opinions regarding the three constructs. The second section has 10 questions and is to obtain basic data for each company and determine whether the firm has joined an e-marketplace, the e-marketplace type

joined (i.e., operated by neutral third-party, dominated by seller or buyer), if they are planning to stay, exit, or switch to another e-marketplace, and whether they are planning to use e-marketplaces if not currently using e-marketplaces. To minimize the risk of respondents not understanding survey questions and of survey questions not correctly reflecting the hypotheses, the survey questionnaire was designed using the following three steps: (1) items for measuring each construct were selected from literature and reworded to specifically relate to the context of utilizing e-marketplaces; (2) each question was answered on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree); (3) two industrial experts and two academics were invited to review and refine the survey questions.

5. Sampling, Reliability and Validity

A questionnaire was sent to 1500 large Taiwanese firms randomly selected from Top 5000 Company List published by China Credit Information Service, LTD. (http://www.credit.com.tw/newweb/DB/index.htm). A total of 295 responses were returned. 93 of which were invalid, resulting in a 13.5% valid response rate. Compared with recent survey of Taiwanese firms such as 12.6% in Tao et al. [2001], 14.6% in Huarng and Chen [2002], 16.5% in Shang and Marlow [2005], and 11.5% in Yu [2006], a 13.5% valid response rate generated from an overall 19.7% response rate is acceptable for empirical industry studies. Among the 202 valid responses, 94 companies have used at least one e-marketplace. Table 3 presents the profiles of these 202 firms, which are briefly summarized as follows. Most responding firms had 1000-3000 employees and the average capital of responding firms was US\$ 64.58 million, indicating that they were large firms rather than the small and medium enterprises. Furthermore, the breakdown of the sample according to industry type reflected the dominance of the electronic, information, optical, machinery, metal, chemistry, and semiconductor industries in Taiwan. When conducting this survey, these firms were very profitable based on the average over 300% ratio of revenue to capital. The average annual membership fee for joining e-marketplaces is roughly US\$1,318 and obviously affordable (not prohibitive) for large firms. Involvement of those utilizing e-marketplaces favor different e-marketplaces in direct/indirect, vertical/horizontal, buver/seller/third-party dominated categories, as displayed in Table 3. Notably, more than 80% of firms utilizing e-marketplaces generated revenue via e-marketplaces ≤ 30 % of the total revenue, whereas roughly 9.5% of these firms generated revenue via e-marketplaces \geq 50% of the entire revenue. Interestingly, 43.9% of firms utilizing e-marketplaces gained more benefit than expected, whereas 31.71% of these firms answered "gained less benefit than expected", and 24.39% answered "benefit gained is equal to benefit expected". This survey finding implies that most Taiwanese firms in late 2004 were still unsuited to consider e-marketplaces a major transaction channel.

Category		Item	Mean or Frequency	Std. Dev. or Percentage
Number of Employee (Person)		1069.41	2493.71	
Cap	ital (Millions o	of US\$)	64.58	90.695
Reve	enue (Millions	of US\$)	240.312	1178.293
Annua	l membership	fee (US\$)	1318.566	1900.531
Member size of t	he adopted e-n	narketplace (Person)	20808.67	48517.84
	Chemistry,	Cement, Petrochemistry	22	10.89%
		Semiconductor	12	5.94%
		Textile	14	6.9%
	Optical,	Machinery, and Metal	28	13.9%
In dustmy Trues	Electro	onics and Information	63	31.2%
moustry Type	Automobile		15	7.4%
	Steel		12	5.9%
	Medicine		5	2.48%
	Food		7	3.47%
		Others	24	11.88%
	Director	Direct	48	51.07%
Type of	Direct vs.	Indirect	11	11.70%
e-Marketplaces	mairect	Unknown	35	37.23%
for Adopted	Mantinal	Vertical	18	19.15%
Firms	Vertical VS.	Horizontal	8	8.51%
	norizontai	Unknown	68	72.34%

Table 3: Respondent profile

	Buyer-,	Buyer-Dominated	18	19.15%
	Seller-, or	Seller-Dominated	9	9.57%
	Third-party	Third-party Dominated	10	10.64%
	Dominated	Unknown	57	60.64%
	Direct ve	Direct	36	33.33%
	Indiract	Indirect	5	4.63%
	munect	Unknown	67	62.04%
Type of	Vartical	Vertical	17	15.74%
e-Marketplaces	Vertical Vs.	Horizontal	7	6.48%
for not-Adopted	Horizonitai	Unknown or Both	84	77.78%
Firms	Buyer-,	Buyer-Dominated	6	5.56%
	Seller-, or	Seller-Dominated	0	0%
	Third-party	Third-party Dominated	11	10.18%
	Oriented	Unknown	91	84.26%
		< 10%	39	41.49%
		10%~20%	15	15.96%
		20%~30%	23	24.47%
Percentage of revenue		30%~40%	5	5.32%
generated from		40%~50%	3	3.19%
for Adopted		50%~60%	2	2.13%
Firms		60%~70%	3	3.19%
1111115		70%~80%	2	2.13%
		80%~90%	2	2.13%
		>90%	0	0%
The benefit your	benefit ga	ined < benefit expected	30	31.71%
e-marketplace and	benefit gained = benefit expected		23	24.39%
expected before using the e-marketplace	benefit gai	ned > benefit expected	41	43.90%

Although survey questions were reworded based on the literature review, factor analysis was applied to test the validity of each construct, classify and reduce questions into sub-constructs when possible, and calculate factor loadings. Factor analysis using SPSS software determined Q1-12 are clearly grouped into three sub-constructs under the construct "firm characteristics", Q13-25 are grouped into two sub-constructs under the construct "competitiveness of the business environment", and Q26-37 are classified into two sub-constructs under the construct "promotion from top management". Inter-item correlation matrices under each construct were examined and were all significant (p < 0.01), as shown in Table 5. Overall, the figures (in Tables 4 and 5) show good predictive, convergent, and discriminant properties for the questions [Adams et al. 1992; Davis 1993]. Additionally, the computed Cronbach α for all dimensions exceed 0.78, suggesting a good content consistency within the questions relating to each factors.

Table 4: Reliability	and	factor	analysis
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Construct	Named Factor	Q #	Factor Loading	Eigen-value	Cumulated Variance	Alp Val	ha ue
	Speed requirement for	Q9	0.812				0.78
	completing transaction and	Q10	0.840	3.085	25 712%	0.875	
	exchanging information	Q11	0.839	5.005	23.71270	0.075	
	(Speed)	Q12	0.796				
	Degree of workflow	Q5	0.806		49.351%	0.825	
Firm characteristics	standardization and	Q6	0.738	2 827			
Firm characteristics	documentation	Q7	0.732	2.037			
	(Standardization)	Q8	0.772				
	Extent of workflow	Q1	0.712		70.618%		
	Extent of workflow	Q2	0.641	2.552		0.840	
	(Computerization)	Q3	0.847			0.840	
	(Computerization)	Q4	0.783				

Table 5: Inter-item correlation matrices
Construct 1. Firm characteristics
Q1
1 Q2 Extent of workflow
0.618 ^{**} 1 Q3 computerization
0.542^{**} 0.573^{**} 1 Q4
$0.605^{**} \ 0.650^{**} \ 0.558^{**} \ 1$
$0.504^{10}_{11}0.427^{10}_{11}0.229^{10}_{11}0.485^{10}_{11}$ 1 Q6 Degree of workflow
$0.388^{\circ}_{\circ} 0.358^{\circ}_{\circ} 0.201^{\circ}_{\circ} 0.260^{\circ}_{\circ} 0.551^{\circ}_{\circ} 1$ Q7 standardization and documentation
$0.315^{\circ\circ}_{\circ\circ} 0.482^{\circ\circ}_{\circ\circ} 0.514^{\circ\circ}_{\circ\circ} 0.661^{\circ\circ}_{\circ\circ} 0.695^{\circ\circ}_{\circ\circ} 1 Q8$
0.413 0.497 0.273 0.416 0.679 0.399 0.660 1
Q9
0.488 0.387 0.236 0.326 0.522 0.249 0.361 0.386 1 Q10 Speed requirement for
0.421 0.324 0.167 0.348 0.484 0.215 0.274 0.329 0.786 1 Q11 completing transaction
0.329 0.394 0.234 0.293 0.381 0.175 0.266 0.259 0.625 0.600 1 Q12 and exchanging
0.290 0.352 0.280 0.302 0.410 0.163 0.322 0.340 0.560 0.595 0.685 1 information
Construct 2. Competitiveness of the business environment
Q13
1 Q14
0.763 1 Q15
0.635 0.677 1 Q16 Simulation from partners,
0.576 ⁺⁺ 0.648 ⁺⁺ 0.887 ⁺⁺ 1 Q17 competitors, or government
0.615 ⁺⁺ 0.710 ⁺⁺ 0.613 ⁺⁺ 0.634 ⁺⁺ 1 Q18
$0.490^{+1}_{-1} 0.538^{+1}_{-1} 0.692^{+1}_{-1} 0.759^{+1}_{-1} 0.549^{+1}_{-1} 1$ Q19
$0.483^{\circ\circ} 0.507^{\circ\circ} 0.591^{\circ\circ} 0.574^{\circ\circ} 0.553^{\circ\circ} 0.638^{\circ\circ} 1 \qquad Q20$
0.397 0.499 0.614 0.643 0.621 0.646 0.718 1
Q21
0.175 0.205 0.249 0.278 0.229 0.337 0.263 0.279 1 Q22 Level of transparency
$0.173^* \ 0.169^* \ 0.233^{**} \ 0.252^{**} \ 0.215^{**} \ 0.350^{**} \ 0.309^{**} \ 0.290^{**} \ 0.832^{**} \ 1 \ Q23 $ of a competitive
0.146^{*} 0.157^{*} 0.160^{*} 0.187^{**} 0.144^{*} 0.287^{**} 0.284^{**} 0.787^{**} 0.833^{**} 1 Q24 environment
0.149^{*} 0.160^{*} 0.177^{*} 0.291^{**} 0.235^{**} 0.376^{**} 0.225^{**} 0.323^{**} 0.667^{**} 0.685^{**} 0.669^{**} 1 Q25
0.140^{*} 0.156^{*} 0.144^{*} 0.215^{**} 0.215^{**} 0.267^{**} 0.220^{**} 0.190^{**} 0.739^{**} 0.738^{**} 0.728^{**} 0.744^{**} 1

		Q13	0.773		40 652%	0.027	
	Stimulation from partners	Q14	0.829				
		Q15	0.881				
	competitors, or government	Q16	0.871	5 285			
	(Pears and Government)	Q17	0.805	5.265	40.03270	0.927	
Competitiveness of	(reers and Government)	Q18	0.778				
the business		Q19	0.741				0.91
environment		Q20	0.754				
		Q21	0.886				
	Level of transparency of a competitive environment (Transparency)	Q22	0.906	4.076	72.007%	0.935	
		Q23	0.906				
		Q24	0.828				
		Q25	0.874				
	Support from e-savvy CEO	Q26	0.697		38.777%	0.918	0.80
		Q27	0.827	4.653			
		Q28	0.835				
	(CEO)	Q29	0.674				
		Q30	0.760				
Promotion from top		Q31	0.843				
management		Q32	0.737				0.89
	Support from a savuy senior	Q33	0.827				
	Support from e-savvy senior	Q34	0.780	4.484	76 1200/	0.025	
	(Senior MGT)	Q35	0.777		/0.139%	0.925	
	(Senior MGT)	Q36	0.826				
		Q37	0.824				

Construct 3. Promotion from top management	
Q26	
1 Q27	
0.638^{**} 1 Q28	
0.689 ^{**} 0.818 ^{**} 1 Q29 Support from e-savvy CEO	
0.616 ^{**} 0.613 ^{**} 0.703 ^{**} 1 Q30	
$0.644^{**} \ 0.614^{**} \ 0.697^{**} \ 0.716^{**} \ 1 \ Q31$	
$0.513^{**} 0.519^{**} 0.555^{**} 0.679^{**} 0.744^{**}$ 1	
Q32	
$0.718^{**} \ 0.554^{**} \ 0.643^{**} \ 0.577^{**} \ 0.531^{**} \ 0.455^{**} \ 1 \ Q33$	
$0.521^{**} 0.768^{**} 0.725^{**} 0.576^{**} 0.515^{**} 0.498^{**} 0.718^{**} 1 Q34$	Support from e-savvy
$0.571^{**} 0.715^{**} 0.249^{**} 0.278^{**} 0.229^{**} 0.337^{**} 0.263^{**} 0.279^{**} 1 Q35$	senior management
$0.583^{**} 0.569^{**} 0.614^{**} 0.818^{**} 0.670^{**} 0.747^{**} 0.615^{**} 0.629^{**} 0.732^{**}$ 1 Q36	C
$0.524^{**} 0.506^{**} 0.545^{**} 0.624^{**} 0.753^{**} 0.689^{**} 0.567^{**} 0.549^{**} 0.623^{**} 0.747^{**}$ 1 Q37	
0.441** 0.524** 0.525** 0.640** 0.710** 0.722** 0.596** 0.612** 0.663** 0.757** 0.782** 1	

* p < 0.05, ** p < 0.01,

6. Hypotheses testing and discussion

Since the t-test is a suitable method of assessing whether the means of two groups are statistically different, this study used t-test to compare the means of firms that use e-marketplaces and those that do not, the means of non-adopting firms that planned to adopt and those that had no such plans, and the means of adopting firms that continue to use e-marketplaces and those that planned to quit/switch. Table 6 presents t-test results for hypotheses 1-9, and, clearly, except for H4, H7, and H9 all hypotheses stand. Furthermore, regardless of whether a company was in pre-adoption, in-adoption, or post-adoption decision phases, "competitiveness of the business environment" significantly affect firm decisions of whether to adopt e-marketplaces. Notably, under the construct "competitiveness of the business environment", "simulation from peers (i.e., partners, competitors, etc.) and government" is a crucial factor influencing a firm's decision to adopt e-marketplaces, while "the transparency of a competitive environment" never significantly influences a firm's decision regardless of its model.

In Model 1, for all sampled firms, the principal cause affecting a company's decision to adopt e-marketplaces is "competitiveness of the business environment", the second and third causes are "promotion from top management" and "firm characteristics". In Model 2, for those firms who have not utilized e-marketplaces, "competitiveness of the business environment" and "promotion from top management" play markedly roles influencing a firm's intention of whether to utilize an e-marketplace. In Model 3, for those firms that use e-marketplaces, only "competitiveness of the business environment" significantly impacts a firm's decision to continue using the e-marketplace.

Dependent Variable		Adoption or not				
		(for all sampled firms)				
		Yes	No		t-value	
Independent Variable	mean	Std Dev	Mean	Std Dev		
Firm characteristics	5.5408	0.7454	5.2868	0.7543	2.402*	
Speed	5.8486	0.7166	5.7883	0.8657	0.536	
Standardization	5.5432	0.8424	5.2856	0.9734	1.998*	
Computerization	5.2840	0.9982	4.8729	1.0422	2.854**	
Competitiveness of the business environment	4.9837	0.7176	4.4409	0.8086	5.000***	
Peers and Government	4.9800	0.7886	4.2491	1.0594	5.488***	
Transparency	4.9885	0.9956	4.7160	0.9941	1.943	
Promotion from top management	5.2314	0.9369	4.7904	0.8576	3.475**	
CEO	5.3158	0.9551	4.8601	0.9144	3.454**	
Senior MGT	5.1439	0.9790	4.7013	0.8827	3.371**	
Dependent Variable]	Planned to adopt or not				
	Yes No			t-value		
Independent Variable	Mean	Std Dev	Mean	Std Dev		

Table 6: Results of Hypotheses 1-9 Testing

Firm characteristics	5.3701	0.6884	5.4244	0.6759	0.281
Speed	5.8509	0.8432	5.8415	0.8623	0.038
Standardization	5.1349	0.8274	5.3900	0.9282	0.982
Computerization	5.0505	0.9702	4.9585	0.9194	0.348
Competitiveness of the business environment	4.9914	0.8998	4.3795	0.7076	2.604**
Peers and Government	4.8484	0.7327	4.1045	0.9895	2.745**
Transparency	4.5878	1.4847	4.7428	0.8628	0.546
Promotion from top management	5.1987	0.8910	4.7565	0.7564	2.012*
CEO	5.2133	0.9996	4.9164	0.7633	1.810
Senior MGT	5.1444	0.8425	4.5839	0.8027	2.051*

Dependent Variable	Continued to use or not (for adopted firms)				
	Yes		N	t-value	
Independent Variable	Mean	Std Dev	Mean	Std Dev	
Firm characteristics	5.5903	0.7076	5.4307	0.9335	0.651
Speed	5.8339	0.6778	5.9310	1.0481	0.402
Standardization	5.5878	0.8360	5.0962	0.8167	1.762
Computerization	5.2987	0.9683	5.1977	1.3168	0.300
Competitiveness of the business environment	5.0805	0.7399	4.4250	0.4582	2.732**
Peers and Government	5.0542	0.7684	4.3544	0.7517	2.729**
Transparency	4.9373	0.9377	5.4057	1.4196	1.407
Promotion from top management	5.2352	0.9134	5.5184	1.1447	1.061
CEO	5.2738	0.9559	5.5573	0.9626	0.886
Senior MGT	5.1933	0.9339	5.4781	1.3492	1.171

From the micro perspective of sub-constructs in Model 1, "speed requirement for completing transactions and exchanging information" and "level of transparency of a competitive environment" have no significant influence on a firm's decision to adopt an e-marketplace, whereas the other five sub-constructs have significant influence on e-marketplace adoption. In Model 2, only two sub-constructs "simulation from peers and government" and "e-savvy senior management" have significant influence on planning to utilize an e-marketplace. In Model 3, the sub-construct "simulation from peers and government" very significantly impacts a firm's decision to continue using the e-marketplace. This finding explains why competitive environment stimuli strongly and significantly influence firms that use e-marketplaces to continue using e-marketplace.

Could the novelty of IS and IT influence firm decisions regarding e-marketplace adoption? Although this investigation did not specifically examine this question in the hypotheses testing, the possible influence of technology novelty might be explained by the innovation diffusion theory [Rogers 2003] from the perspective of user firm innovativeness. In 1958, Rogers found that the rate for adopting innovative technology can be represented by a bell-shaped (frequency) curve or an S-shaped (cumulative) curve. Rogers employed normal frequency distribution to classify individual adopters into five categories: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%). Notably, the percentage for each category is approximated and Rogers' adopter classification system is asymmetrical as three adopter categories are left of the mean (50%) and only two are to the right. Since different categories of individual consumers hold different beliefs and attitudes, such as innovators (adventuress), early adopters (respect), early majority (deliberate), late majority (skeptical), and laggards (traditional) [Rogers, 2003], marketing managers frequently employ these different consumer characteristics to acquire marketing advantages.

As a result, based on the rate of e-marketplace adoption over the last five years and this survey conducted in late 2004, firms using e-marketplaces can be considered as innovators, early adopters, and early majority, whereas those firms planning to use e-marketplaces can be deemed members of the late majority, and those not planning to use e-marketplaces can considered laggards. Accordingly, the 202 responding businesses are initially segmented into those who have utilized e-marketplaces and those who have not. Next, these groups are separated by their choice of e-marketplace type. Table 7 presents a summary of respondent characteristics. After initially classifying 202 responding businesses into those who join e-marketplaces and those who do not, seven sub-constructs are employed to perform cluster analysis. After repeated cluster analyses until discovering the significant classification, the 202

responding firms are finally divided into six groups based on three sub-constructs "speed", "transparency", and "CEO" (as shown in Table 8). Some clues may be drawn from Tables 7 and 8 for e-marketplaces managers to develop suitable service/marketing strategies to drive enterprises to use e-marketplaces and feel satisfy with e-marketplace services.

		Adopted firm		N	m		
		Continue to stay in	Plan to exit or switch	P value	Plan to join in a year	Continue not to adopt	P value
Tune of	Direct	45	3				
Type of	Indirect	9	2	0.230			
e-marketprace	Unknown or Both	30	5				
Tune of	Vertical	17	1				
a marketplace	Horizontal	6	2	0.215			
e-marketplace	Unknown or Both	61	7				
	Buyer	14	4				
Type of	Seller	9	0	0.042			
e-marketplace	Third party	10	0	0.045			
	Unknown	51	6				
	< 10%	29	10				
Percentage of	10%~20%	15	0				
	20%~30%	23	0				
	30%~40%	5	0				
revenue	40%~50%	3	0	0.000			
generated from e-Marketplaces	50%~60%	2	0	0.000			
	60%~70%	3	0				
	70%~80%	2	0				
	80%~90%	2	0				
	>90%	0	0				
The benefit your company gained	benefit gained < benefit expected	20	10				
from	benefit gained =	23	0				
e-marketplace	benefit expected			0.000			
and expected before joining the	benefit gained >	41	0				
e-marketplace	benefit expected						
Number of Em	ployee (Person)	1840	756	0.057	1413	700	0.151
Capital (Mil	lions of NT\$)	2803	1914	0.215	1695	453	0.000
Revenue (Mi	llions of NT\$)	13709	5858	0.000	4665	1275	0.001

Table 7: Investigated data for each category

Table 8: Investigated data for each cluster

		Adopted firm		Not	adopted f	ïrm	
Group Number		1	2	3	4	5	6
Number of Firms		29	41	24	17	50	38
	Speed	4.21	5.92	5.57	4.73	2.79	5.51
Firm characteristics	Standardization	4.73	5.93	5.84	5.74	2.69	5.83
	Computerization	5.23	6.30	6.13	5.88	4.12	5.81
Competitiveness of the business environment	Peers and Government	5.16	5.59	4.10	2.20	4.14	4.88
	Transparency	4.55	5.62	4.32	2.79	4.21	5.17
Promotion from top management	CEO	4.89	6.06	5.17	5.64	4.51	4.34
	Senior MGT	4.35	5.83	4.93	4.135	4.323	4.91

Drilling down information for separated six groups								
Adamtan	Continue to stay in	26	37	21				
Adopter	Plan to exit or switch	3	4	3				
Non adoptor	Plan to join within a year				2	8	9	
Non adopter	Continue not to participate in				15	42	29	
Type of	Direct	65.5%	43.9%	45.8%				
e-marketplace that	Indirect	0.0% 26.8% 0.0%						
firms adopted or like	Unknown	34.5%	29.3%	54.2%				
to join	UIKIIOWII							
Type of	Vertical	20.7%	22.0%	12.5%				
e-marketplace that	Horizontal	0.0%	9.8%	16.7%				
firms adopted or like	unknown	79.3%	68.2%	70.8%				
to join	ulikilöwli							
Type of	Buyer	27.6%	14.6%	16.7%				
e-marketplace that	Seller	13.8%	12.2%	0.0%				
firms adopted or like	Third party	13.8%	9.8%	8.3%				
to join	Unknown	44.8%	63.4%	75%				

7. Conclusions and Future Research

This study examined the factors that contribute to firm decision to participate in an e-marketplace via a research structure of three models, namely pre-adoption, in-adoption, and post-adoption. Five conclusions can be drawn from this study. First, three main factors driving a company to adopt e-marketplaces are identified, namely "firm characteristics", "competitiveness of the business environment", and "promotion from top management". Second, at the pre-adoption stage, the firm intention to adopt e-marketplace is considerably influenced by "competitiveness of the business environment" and "promotion from top management". Third, at the post-adoption stage, only "competitiveness of the business environment" significantly influences e-marketplace-adopting firm intention to continue using the e-marketplace. Fourth, "the competitiveness of the business environment" is the most critical cause influences on firm decision to adopt or not adopt an e-marketplace, while the second and third significant causes are "promotion from top management" and "firm characteristics". Fifth, examining the differences between e-marketplace-adopting firms and e-marketplace-non- adopting firms reveals that adopting-firms have significant higher stimulation from peers and the government, level of computerization, and promotion from CEO and senior management than non-adopting firms.

Besides, this empirical survey also found that revenue generated from e-marketplaces for most e-marketplace-adopting firms was lower than expected. By utilizing cluster analysis, detail comparisons among clusters are presented in Tables 7 and 8. Both tables summarize differences between e-marketplace-adopting firms and e-marketplace-non-adopting firms, between e-marketplace-non- adopting firms plan to join e-marketplaces and those firms continue not to use e-marketplaces, and between e-marketplace-adopting firms plan to exit e-marketplaces and those firms continue to use e-marketplace. E-marketplace management may utilize these findings to develop effective business and promotion strategies for firms that not use, use, and plan to use e-marketplaces via pre-adoption, in-adoption, and post-adoption stages. Although this study focuses on e-marketplaces, this research provides a useful staring point for advanced research into understanding the factors compelling a firm to adopt or use other Internet-based technology services, products, and/or business models.

Notably, this study has certain limitations. First, this work is not a longitudinal study. That is, the analysis separates respondents into two independent groups- e-marketplace-adopting firms and e-marketplace-non- adopting firms- rather than observing the same respondents over time through pre-adoption, in-adoption, to post-adoption. Therefore, future works can conduct a longitudinal study to examine differences among the five categories based on the theory of Rogers. Second, this investigation takes an individual firm as the analysis unit instead of individual consumer as in the theory of Roger. Further research can compare differences between industry consumer (firm) behavior and individual consumer behavior according to the adopter categories of innovators developed by Rogers, namely early adopters, early majority, late majority, and laggards. Third, owing to the samples being limited to Taiwanese enterprises, cautious is needed in generalizing the findings of this study to other countries with different cultures or industry structures.

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REFERENCES

- Afuah, A. and Tucci, C. L., Internet Business Models and Strategies: Text and Cases, McGraw-Hill, New York, 2001.
- Adams, D. A., R. R. Nelson, and P. A. Todd, "Perceived Usefulness, Ease of Use, and Usage of Information," MIS Quarterly, Vol. 16, No. 2:227-247, 1992.
- Aisbett, J., R. Lasch, and G. Pires, "A Decision-Making Framework for Adoption of E-Procurement," *International Journal of Integrated Supply Management*, Vol. 1, No. 3: 771-798, 2005.
- Angeles, R., "Revisiting the Role of Internet-EDI in the Current Electronic Commerce Scene," *Logistics Information Management*, Vol. 13, No. 1:45-50, 2000.
- Bakos, J. Y., "A Strategic Analysis of Electronic Marketplace", MIS Quarterly, Vol. 15, No. 3:295-310, 1991.
- Bakos, J. Y., "Reducing Buyer Search Costs: Implications for Electronic Marketplaces," *Management Science*, Vol. 43, No. 12:1676-1692, 1997.
- Bakos, J. Y., "The Emerging Role of Electronic Marketplaces on the Internet," *Communications of the ACM*, Vol. 41, No. 8:35-42, 1998.
- Chau, P. Y. K., "Inhibitors to EDI Adoption in Small Businesses: An Empirical Investigation," *Journal of Electronic Commerce Research*, Vol. 2, No. 2:78-88, 2001.
- Clemons, E. K., S. P. Reddi, and M. C. Row, "The Impact of Information Technology on the Organization of Production: The 'Move to the Middle' Hypothesis," *Journal of Management Information Systems*, Vol. 10, No. 2:9-35, 1993.
- Clemons, E. K. and Yu. M. Wang, "Special Issue: Technology Strategy for Electronic Marketplace," *Journal of Management Information Systems*, Vol. 17, No. 2:5-7, 2000.
- Davis, F. D., "User Acceptance of Information Technology: System Characteristics, User perceptions and Behavioral impacts," *International Journal of Man-Machine Studies*, Vol. 38, No. 3:475-487, 1993.
- Driedonks, C., S. Gregor, A. Wassenaar, and E. van Heck, "Economic and Social Analysis of the Adoption of B2B Electronic Marketplaces: A Case Study in the Australian Beef Industry," *International Journal of electronic Commerce*, Vol. 9, No. 3:49-71, 2005.
- eMarketer, "E-Commerce Trade & B2B Exchange," *http://www.emarketer.com/ products/report.php?2000145*, 2004.
- Fairchild, A. M., P. M. A. Ribbers, and A. O. Nooteboom, "A Success Factor Model for Electronic Markets: Defining Outcomes Based on Stakeholder Context and Business Process," *Business Process Management Journal*, Vol. 10, No. 1:63-79, 2004.
- Faloon, K., "E-Marketplace to Lower Costs in Supply Chain," *Supply House Times*, Vol. 43, No. 6:43-44, August 2000.
- Gartner Group, "Asia/Pacific SCM: Waiting for the Turnaround, 2003-2007," http://www.gartner.com/, 2003.
- Gebauer, J., *Electronic markets from an economic perspective, Emerging Electronic Markets (II)*, Version 1.0-St. Gallen : Institute fur Wirtschaftsinformatik, HSG/CCEM 36, September 1999.
- Gefen, D, and D. Straub, "The Relative Importance of Perceived Ease of Use in IS Adoption: A Study of E-Commerce Adoption," *Journal of the Association for Information Systems*, Vol. 1:1-30, 2000.
- Grieger, M., "Electronic Marketplaces: A Literature and A Call for Supply Chain Management Research," *European Journal of Operational Research*, Vol. 144, No. 2: 280-291, January 2003.
- Grewal, R., J. M. Comer, and R. Mehta, "An Investigation into the Antecedents of Organizational Participation in Business-to-Business Electronic Markets," *Journal of Marketing*, Vol. 65, No. 3:17-33, July 2001.
- Gottschalk, P. and A. F. Abrahamsen, "Plans to Utilize Electronic Marketplaces: the Case of B2B Procurement Markets in Norway," *Industrial Management & Data Systems*, Vol. 102, No. 5:325-331, 2002.
- Grover, V. and M. D. Goslar, "The Initiation, Adoption, and Implementation of Telecommunications Technologies in U.S. Organization," *Journal of Management Information Systems*, Vol. 10, No. 1:141-163, 1993.
- Grover, V. and P. Ramanlal, "Playing the E-Commerce Game", Business & Economic Review, Vol. 47, No. 1:9-14, October, 2000
- Guilherme, D. P. and J. Aisbett, "The Relationship Between Technology Adoption and Strategy in Business-to-Business Markets: The Case of E-Commerce," *Industrial Marketing Management*, Vol. 32, No. 4:291-306, 2003.

- Huarng, F. and Y. T. Chen, "Relationships of TQM Philosophy, Methods and Performance: A Survey in Taiwan," *Industrial Management & Data Systems*, Vol. 102, No. 3:226-234, 2002.
- Iacovou, C. L., I. Benbasat, and A. S. Dexter, "Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology," *MIS Quarterly*, Vol. 19, No. 4:465-485, 1995.
- IDC Report, "Internet and eCommerce 2005-2007 Forecast," http://www.idc.com/, 2005.
- Jupiter Research, "B2B E-Commerce Survey," <u>http://www.jupiterresearch.com/bin/item.pl/home</u>, 2002.
- Kalakota, R. and A. B. Whinston, *Electronic Commerce: A Manager's Guide*, Addison-Wesley: New York, U.S., 1997.
- Karahanna, E., D. W. Straub, and N. L. Chervany, "Information Technology Adoption Across Time: A Cross-Sectional Comparison of Pre-Adoption and Post-Adoption Beliefs," *MIS Quarterly*, Vol. 23, No. 2:183-213, 1999.
- Kaplan, S. and M. Sawhney, "E-Hubs: The New B2B Marketplaces," *Harvard Business Review*, Vol. 78, No. 3:97-103, 2000.
- Kendall, J., L. L. Tung, K. H. Chua, C. H. D. Ng, and S. M. Tan, "Electronic Commerce Adoption by SMEs in Singapore," *Proceedings of the 34th Hawaii International Conference on System Sciences*, pp. 1-10, Hawaii, U.S., January 3-6, 2001.
- King, R. C. and M. L. Gribbins, "Adoption of Organizational Internet Technology: Can Current Technology Adoption Models Explain Web Adoption Strategies in Small & Mid-Sized Organizations?," *International Journal of Management Theory and Practices*, Vol. 4, No. 4:49-61, 2003.
- Koch, H., "Business-to-Business Electronic Commerce Marketplaces: The Alliance Process," Journal of Electronic Commerce Research, Vol. 3, No. 2:67-76, 2002.
- Lai, W. S., Studying the decision factors and execution status of enterprises in adopting e-store strategies, Master Thesis of Da-Ye University, Taiwan, 1998.
- Lee, H. G., "Do Electronic Marketplaces Lower the Price of Goods?," *Communications of ACM*, Vol. 41, No. 1:7380, 1998.
- Lee, S. and G. G. Lim, "The Impact of Partnership Attributes on EDI Implementation Success," Information & Management, Vol. 42, No. 5:503-516, 2005.
- Leebaert, D., The Future of the Electronic Marketplace, MIT Press, Massachusetts, 1998.
- Lu, D. and F. Antony, "Implications of B2B Marketplace to Supply Chain Development," *The TQM Magazine*, Vol. 15, No. 3:173-179, 2003.
- Malone, T. W., R. I. Benjamin, and J. Yates, "Electronic Markets and Electronic Hierarchies: Effects of Information Technology on Market Structure and Corporate Strategies," *Communications of ACM*, Vol. 30, No. 6:484-497, 1987.
- Metcalfe, D., Meringer, J. and Mendez, M. A., "The Future of Europe's Online B2B Trade, Business View Report," http://www.forrester.com/ER/Research/Report/ Summary/0,1338,15378,00.html, 2002.
- MIC, 2003 e-commerce industry annual report, Market Intelligence Center Press, Taipei, 2004.
- Molla, A. and P. S. Licker, "eCommerce Adoption in Developing Countries: A Model and Instrument," *Information & Management*, Vol. 42, No. 6:877-899, 2005.
- O'Callaghan, R., R. J. Kaufmann, and B. R. Konsynski, "Adoption Correlates and Share Effects of Electronic Data Interchange Systems in Marketing Channel," *Journal of Marketing*, Vol. 56, No. 1:45-56, 1992.
- Piccinelli, G., G. Di Vitantonio, and L. Mokrushin, "Dynamic Service Aggregation in Electronic Marketplaces," *Computer Networks*, Vol. 37, No. 1:95-109, 2001.
- Pollard, C., "E-Service Adoption and Use in Small Farms in Australia: Lessons Learned From a Government-Sponsored Program," *Journal of Global Information Technology Management*, Vol. 6, No. 2:45-63, 2003.
- Poon, S. and P. M. C. Swatman, "An Exploratory Study of Small Business Internet Commerce Issues," *Information & Management*, Vol. 35, No. 1:9-18, 1999.
- Premkumar, G., K. Ramamurthy, and S. Nilakanta, "Implementation of Electronic Data Interchange: An Innovation Diffusion Perspective," *Journal of Management Information Systems*, Vol. 11, No. 2:157-186, 1994.
- Premkumar, G. and M. Roberts, "Adoption of Computer Aided Software Engineering (CASE) Technology: An Innovation Adoption Perspective," *Data Base Advances*, Vol. 26, No. 2:105-124, 1995.
- Raisch, W. D., The eMarketplace: Strategies for Success in B2B eCommerce, McGraw-Hill, New York, 2000.
- Raisnghani, M. S. and H. C. L. Hanebeck, "Rethinking B2B E-Marketplaces and Mobile Commerce: From Information to Execution," *Journal of Electronic Commerce Research*, Vol. 3, No. 2:87-97, 2002.
- Rash, M. and H. Kragh, "Motives for E-Marketplace Participation," *Electronic Markets*, Vol. 14, No. 4:270-283, 2004.

Ratnasingam, P., D. Gefen, and P. A. Pavlou, "The Role of Facilitating Conditions and Institutional Trust in Electronic Marketplaces," *Journal of Electronic Commerce in Organizations*, Vol. 3, No. 3:69-82, 2005.

Rogers, E. M., Diffusion of Innovations (5th edition), Free Press, New York, 2003.

Sanders

- Sculley, A. B. and W. A. Woods, *B2B exchanges: The killer Application in the Business-to-business Internet Revolution*, HarperCollins: New York, U.S., 2001.
- Shang, K. C. and P. B. Marlow, "Logistics Capability and Performance in Taiwan's Major manufacturing Firms," *Transportation Research Part E: Logistics & Transportation Review*, Vol. 41, No. E3: 217-232, 2005.
- Singh, R., A. F. Salam, and L. Iyer, "Agents in E-supply Chains," *Communications of The ACM*, Vol. 48, No. 6:109-115, 2005.
- Skjott-Larsen, T., H. Kotzab, and M. Grieger, "Electronic Marketplaces and Supply Chain Relationships," *Industrial Marketing Management*, Vol. 32, No. 3: 199-212, 2003.
- Slade, P. and J. Van Akkeren, "Business Online? An Empirical Study of Factors Leading to the Adoption of Internet Technologies by Australian SMEs," *Australian Journal of Information Systems*, Vol. 10, No. 1:50-65, 2002.
- Sodhi, M. S., "Applications and Opportunities for Operations Research in Internet-Enabled Supply Chains and Electronic Marketplaces," *Interfaces*, Vol. 31, No. 2:56-67, 2001.
- Strader, T. J. and M. J. Shaw, "Consumer Cost Differences for Traditional and Internet Markets," Internet Research, Vol. 9, No. 2:82-93, 1999.
- Tao, Y., I. Ho, and R. Yeh, "Building a User-Based Model for Web Executive Learning Systems A Study of Taiwan's Medium Manufacturing Companies," *Computer & education*, Vol. 36, No. 4:317-332, 2001.
- Thong, J. Y. L. and C. S. Yap, "CEO characteristics, Organizational Characteristics and Information Technology Adoption in Small Business," *Omega*, Vol. 23, No. 4:429-442, 1995.
- Thong, J. Y. L., "An Integrated Model of Information Systems Adoption in Small Business," Journal of Management Information Systems, Vol. 15, No. 4:187-214, 1999.
- Travica, B., "Diffusion of Electronic Commerce in Developing Countries: The Case of Costa Rica", Journal of Global Information Technology Management, Vol. 5, No. 1:4-24, 2002.
- White, A, and E. Daniel, "Electronic Marketplaces: An Empirical Study in the UK Healthcare Sector," *International Journal of Electronic Business*, Vol. 2, No. 6:603-624, 2004.
- Wu, J. H. and S. C. Wang, "What Drives Mobile Commerce? An Empirical Evaluation of the Revised Technology Acceptance Model," *Information & Management*, Vol. 42, No. 6:719-729, 2005.
- Yu, C. S., "Critical Success Factors of Taiwan B2B E-Marketplace and Affecting Critical Success Factors' Major Industrial Characteristics," Proceedings of 2003 International Conference of Pacific Rim Management, CD-ROM:888-893, Seattle, July 31-August 2, 2003.
- Yu, C. S., "Exploring Influences on Taiwanese SMEs E-Marketplace Adoption Decision," *Journal of Global Information Technology Management*, Vol. 9, No. 2:5-21, 2006.
- Zhu, K., "Information Transparency in Electronic Marketplaces: Why Data Transparency May Hinder the Adoption of B2B Exchanges," *Electronic Markets*, Vol. 12, No. 2:92-99, 2002.

APPENDIX A. QUESTIONNAIRE

Note: The questionnaire was translated from Chinese version, and each question was answered on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Information system and information technology were abbreviated as IS and IT, respectively, in the questionnaire. Besides, the questions were reordered following Table 2 for reading convenience.

Section 1

- Q1. All data communication tasks are processed via IS
- Q2. All business reports are generated by IS
- Q3. All problems are communicated via IS
- Q4. All business processes are interconnected by IS
- Q5. All procurement processes are clear and distinct
- Q6. All procurement processes are documented
- Q7. All questions regarding procurement processes can be answered from the documentation
- Q8. All procurement processes are easily to be computerized
- Q9. Timing for finding qualified and suitable suppliers is absolute important
- Q10. Timing for obtaining product offerings from suppliers is absolute important
- Q11. Timing for responding product offerings to suppliers is absolute important

Q12. Timing for completing a transaction is absolute important

Q13. A majority of leading enterprises within the supply chain use e-marketplaces

Q14. A majority of trading parties within the supply chain use e-marketplaces

Q15. Using e-marketplaces can benefit the trading relationship with partners

Q26. Using e-marketplaces can enhance the collaboration with partners

Q17. A majority of peer competitors have adopted e-marketplaces

Q18. Using e-marketplaces is helpful in gaining competitive advantages

Q19. The government is actively promoting e-marketplaces

Q20. Using e-marketplaces is easier to get government grants

Q21. The transparency of market information is very high in your industry

Q22. The transparency of trading party information is very high in your industry

Q23. The transparency of product information is very high in your industry

Q24. The transparency of procurement information is very high in your industry

Q25. The transparency of competition information is very high in your industry

Q26. The CEO highly recognizes that IT/IS can enhance the firm's competitiveness

Q27. The CEO highly recognizes that e-marketplace can enhance the firm's competitiveness

Q28. The CEO 's awareness of e-marketplace is very positive

Q29. The CEO approves a significant amount of budget on IT/IS every year

Q30. The CEO's knowledge or experience in IT/IS is significant

Q31. The CEO frequently meets with IT/IS staff

Q32. Senior management highly recognizes IT/IS can enhance the firm's competitiveness

Q33. Senior management highly recognizes e-marketplace can enhance the firm's competitiveness

Q34. Senior management's awareness of e-marketplace is very positive

Q35. Senior management allocates a significant amount of budget on IT/IS every year

Q36. Senior management's knowledge or experience in IT/IS is significant

Q37. Senior management frequently meets with IT/IS staff

Section 2

If your firm are participating more than one e-marketplace, please based on the major e-marketplace your firm used to answer the following questions.

Q38. What is the industry type of your company?

Q39. What is the employee size of your company? _____ Persons

Q40.What is the approximate capital of your company? NT\$_____

Q41. What is the approximate annual revenue of your company? NT\$

Q42. Has your company adopted any e-marketplace yet?
Yes
No

Q43. If your firm has adopted an e-marketplace, please answer Q43a and Q43b. Otherwise, please answer Q43c and Q43d.

Q43a. Will your company continue to use the	existing e-marketplace?	□Yes	□No
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Q43b. Will your company withdraw from the existing e-marketplace? \Box Yes \Box No

Q43c. Does your company plan to adopt an e-marketplace within a year? \Box Yes \Box No

Q43d. Does your company plan not to adopt an e-marketplace within a year? \Box Yes \Box No

Q44. The type of e-marketplace your firm is using or plans to join belongs to

Q44a. \Box a direct e-market place or \Box an indirect e-market place

Q44b. \Box a vertical e-marketplace or \Box a horizontal marketplace.

Q44c. \Box a buyer-dominant e-marketplace, \Box a seller-dominant e-marketplace, or \Box a third party-operated e-marketplace

Q45. If your company has adopted an e-marketplace, what percentage of the annual revenue is derived from the e-marketplace?

□0%~10%	□10%~20%	□20%~30%	□30%~40%	□40%~50%
□50%~60%	□60%~70%	□70%~80%	□80%~90%	□90%~100%

Q46. What is the annual membership fee of the e-marketplace your company adopted? NT\$____

Q47. Comparing the benefit your company gained from adopting and expected before joining the e-marketplace,

which following status best fits your company' perception?

□ benefit gained less than benefit expected,

□ benefit gained equal to benefit expected, or

□ benefit gained more than benefit expected