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CREATING E-BUSINESS VALUE AND FIRM PERFORMANCE FROM SUPPLY CHAIN PERSPECTIVE

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Abstract

After e-commerce (electronic commerce) bubbled in the new millennium, the trend of information technology thus moved forward e-business (electronic business) manifestly. This is because e-business integrated and valued greater than e-commerce both in the physical and virtual networks. Also, it apparently shows that businesses are planning to achieve digitally tightened integration with suppliers, customers, and employees from the development of information technology in recent years. It means that e-business technologies are widely used by businesses. However, not all businesses are successfully using e-business technologies. Some of them face the failure of e-business technologies use to yield satisfactory value and firm performance due to the much more important lack of significant knowledge or capability to use e-business technologies. Therefore, such researches of e-business have been paid much attention by academia and practitioners. This study would initially investigate the relevant references of e-business technologies use and IT integration capability in order to identify the involved relationships. Furthermore, intrafirm integration and interfirm integration are regarded as two significant mediators and then try to verify the influence of above-mentioned variables on e-business value and firm performance so as to propose the research model. The results and findings in this study support the hypotheses we presented in the light of 248 respondents gathered from Taiwan top 1000 enterprises. Expect that there is a guideline to follow and the research model would contribute to enhance the success of e-business value and firm performance for businesses as using e-business technologies. Moreover, the results and findings of this study could be as the reference for academia and practitioners as conducting related researches.

Keywords: IT integration capability, Intrafirm integration, Interfirm integration, e-Business value.

1 INTRODUCTION

The rapid advance of information technology (IT) and modern organizations with widespread interactions, in particular the rise of the Internet and a wide range of business system applications, make e-commerce emerge in the late 90's. Since e-commerce bubbled in the early 21st century, the apparent trend of IT thus moves forward the direction of electronic business (e-business). Kalakota and Robinson (2001) show more clearly that a company has to carry out structural changes inside in order to be more efficient in competition with others in the world of e-business. Such structural changes require establish innovative e-business strategies by firms. That is, the pursuit of computerized business in the past have turned into e-business in the present day, moreover, it has become a significant trend for businesses employing IT. e-Business technologies helps to break through the traditional business limitation, to improve the overall business processes, and to strengthen the relationships with customers, employees, business partners, and suppliers (Sanders 2007). It have clearly been known that companies are striding forward the direction of much closer digital integration with suppliers, customers and employees from the development of IT in the supply chain context in recent years, in other words, e-business technologies are widely used by businesses to streamline supply chain management (SCM) activities. Furthermore, e-business technologies could create more value for businesses in the current economic environment such as digital integration (Rai et al. 2006).

Although the researches of e-business have been extensively valued and interested in academia and practical community, it still has considerable controversy for further improvement. For example, some research investigations identify that IT investment does not often contribute to better financial performance (Melville et al. 2004) even though the ratio of IT investment is getting higher and higher in businesses (Laudon & Laudon 2007). Melville et al. (2004) imply that IT is not a direct influence on firm performance and emphasize the necessity for businesses establishing complementarities which could be interpreted as integration. Only the use of e-business technologies is not sufficient, more important, the concept of overall integration as using e-business technologies could create more value for businesses so as to exert potential synergy existed in e-business technologies. It could really enhance firm performance is how to create value efficiently which the value derived from organizational integration. On another hand, not all businesses are successfully using e-business technologies. Some of them face the failure of e-business technologies use to yield satisfactory value and firm performance due to the much more important lack of significant integrated capability to use e-business technologies. Hence, IT integration capability could be regarded as readiness before using e-business technologies in the supply chain background (Saraf et al. 2007). Specifically, developing IT integration capability is much more important for value creation.

Unfortunately, less attention has been paid to integrate two research trends between IT capability and e-business technologies use into the context of e-business value creation particularly in supply chain setting although previous works have identified IT capability has the potential of improving firm performance to firms (Bharadwaj 2000; Kearns & Lederer 2003) and e-business technologies use is one of the sources of firm performance (Sanders 2007). Furthermore, some studies have found that "productivity paradox" might exist in the measurement between IT investment and firm performance. It also exhibits that inadequate performance measurement particularly employing financial performance (Soto-Acosta & Merono-Cerdan 2008).

As a result, this study attempts to develop a conceptual model in order to evaluate e-business value creation at the level of firms. The analysis employs a sample of 248 companies from various industries for hypotheses testing. The present study would like to fulfil the aforesaid gaps in the research. Expect that there is a guideline to follow and the research model would contribute to enhance the success of e-business value and firm performance for businesses as using e-business technologies.

2 RESEARCH MODEL AND THEORETICAL DEVELOPMENT

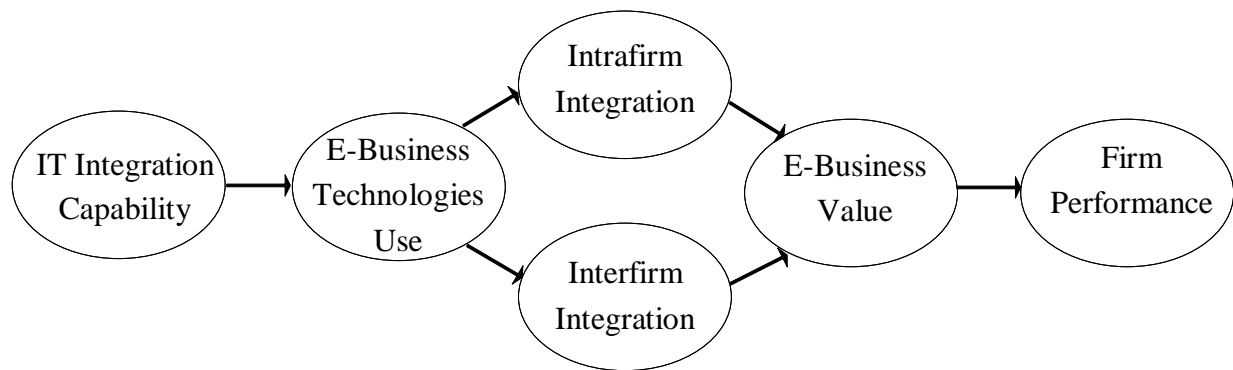


Figure 1. Research model for creating e-business value and firm performance

2.1 IT Integration Capability and e-Business Technologies Use

e-Business is made possible by various technologies in use by a firm, involving the IT capability and Internet specific technologies (Zhu 2004). Previous literature indicates that the investigation of e-business technologies use needs to take IT capability of businesses into consideration (Cooper & Zmud 1990). IT capability has been identified to be relevant to e-business technologies use (Thong 1999). Zhu and Kraemer (2005) argued the importance of IT capability for successful e-business technologies use. This theoretical proposition was consolidated by a large number of empirical works (Mata et al. 1995). Therefore, the study began with IT capability in the research model.

On the one hand, investigation on IS in supply chain has demonstrated that IT could create “electronic integration” (Hart & Estrin 1991). The capability of IT integration could be regarded as describing efficiency in literature (Adler et al. 1999). This reflects the necessity to sustain rich integration (Gosain et al. 2004). A high degree of IT integration capability could be featured by data, once recorded by a business, being promptly available by its employees, suppliers, and customers. This is not only related to the integration between various databases or implementation of a single enterprise-wide database but the integration at the semantic level (Yang & Papazoglou 2000). It is only that e-business technologies could be exerted to unfold its potential synergy when such IT integration capability occurs (Saraf et al. 2007). In this study, it defines the capability of IT integration as the extent to which a company has founded IT capability for the consistent and rapid transfer of supply chain-related information between divisions within the company and across other organizations. IT integration capability is consisted of two sub-constructs: data consistency and cross-functional integration of SCM system applications (Rai et al. 2006). e-Business technologies use is defined as the extent to which e-business technologies are being used to drive follow-up intra and interfirm integration. This is estimated by the breadth of use for varied system applications and the depth of use for each application that has been moved to the Internet. Businesses with a higher level of IT integration capability are likely to exert greater efficiency as using e-business technologies in their integrated processes (Zhu & Kraemer 2005). Consequently, they would be more likely to reach a greater degree of e-business technologies usage. This results in the following hypothesis.

H1. Firms with higher IT integration capability have a positive impact on e-business technologies use.

2.2 e-Business Technologies Use and Organizational Integration

e-Business technologies have remarkably enhanced integration with supply chain partners allowing better customer and supplier integration for order scheduling, inventory planning, requirement forecasting, and customer relationship management (Feeny 2001). The Internet-enabled and web-based system applications, are named e-business technologies in this study, have a notably important

influence on practices as a result of the interoperability and open-standard settings for the transfer of data among firms (Rabinovich et al. 2003). A number of top management regarded e-business technologies as the business's top strategic weapon. However, they claimed that the root of competitive advantage was not technology in itself but better information transferring offered by these system applications (Sanders 2007). The appearance of e-business technologies might have had the greatest influence on information exchange within a supply chain until now (Rabinovich et al. 2003). e-Business technologies have overtopped other information technologies such as fax in information transferring capability and cost (Chopra et al. 2001). Fax enabled exchanging of restricted information with a small number of partners at a comparatively high cost. e-Business technologies-enabled supply chains are strong strategic instruments in virtue of their matchless integration of information among partners and comparatively inexpensive transaction cost at present.

The proposition that e-business technologies foster organizational integration is further advocated by transaction cost economics. The prerequisite of the literature in transaction cost economics is that integration among businesses is confined by the transaction cost of managing the interaction (Coase 1937; Stoeken 2000). While transaction costs are on the increase, market transaction efficiency would be on the decrease. Those inefficiencies might lead to greater market prices and foster vertical/horizontal integration in the supply chain (Sanders 2007). e-Business technologies have been demonstrated to reduce transaction costs and integration costs which contain immediate costs of integrated decisions (Nooteboom 1992), and transaction risk which is the danger of being applied in the relationship (Clemons & Row 1992; Clemons et al. 1993). Transaction cost economics propounds that e-business technologies might foster organizational integration once it decreases transaction costs. e-Business technologies might have a specifically great influence owing to their interoperability, open standards, and low cost (Sanders 2007).

Supply chain management practices include wide-range works, certain internal and certain external to the business, all with the main purpose of creating value for the partners in the supply chain (Sanders 2007). This is fulfilled through integration of works among connected businesses, and might lead to diminished costs owing to the removal of resource waste and operating repetition (Andraski 1998; Stank et al. 2001). This calls for participating in integration that is both internal and external to the business (Stank et al. 2001). The singular influence of e-business technologies on both internal and external integration has rarely been examined to date.

Intrafirm integration is a concept defined as a joint shared process where two or more divisions work together, have common agreement, have a mutual vision, share resources, and reach common objectives (Stank et al. 2001). Intrafirm integration calls for cross-functional collaboration, coordination, cooperation and integrated data bases sharing. Interfirm integration is defined in a similar way with intrafirm integration, with the concern of integration is between two or more firms, rather than divisions. Interfirm integration calls for information sharing across the complete scope of supply chain partners, as well as intrafirm cross-functional processes sharing (Sanders 2007). The connection between e-business technologies and intra and interfirm integration has been expected by previous investigations (Raghunathan 1999) although it has been rarely directly proved. Nevertheless, investigations have examined the relationship between broad information technology use and other concepts relating to organizational integration (Mohr & Nevin 1990). Kent and Mentzer (2003) verified a solid and positive connection between investment in information technologies and relationship commitment between supply chain participants. Other practitioners have shown that IT use might reduce integration costs (Clemons & Row 1992; Clemons et al. 1993), supposed to result in enhanced integration (Vickery et al. 2003) Modern IT development such as standardized and modular software elements might enable a greater level of organizational integration (Hagel & Brown 2001). Those researches jointly foster the development of following two hypotheses that argue a positive influence of e-business technologies use on both intra and interfirm integration.

H2. Firms with greater e-business technologies use have a positive influence on intrafirm integration.

H3. Firms with greater e-business technologies use have a positive influence on interfirm integration.

2.3 Organizational Integration and e-Business Value

Businesses create unique value by integrating their applications and databases internally and with their partners externally (Zhu & Kraemer 2002). Organizational integration enables companies to exchange two-way instant information with partners, provide customization capability, and deliver services via online management, thus raising transactional efficiency and widening the current channels (Zhu & Kraemer 2002). In addition, organizational integration enables businesses accomplish technology integration and fosters information sharing within the organization and in the value chain. Hence, it is expected that better organizational integration has the potential to create e-business value for firms.

For more detail, information reach and richness could lower information asymmetry (Zhu 2004) and e-business could essentially enhance transactional efficiency (Malone & Laubacher 1998). Moreover, e-business could realize lock-in by exerting diverse interactive system applications such as virtual communities and customization (Amit & Zott 2001). Simultaneously, e-business links partners in physical location that was expensive to connect before e-business emergence (Zhu & Kraemer 2005). Such market growth more enhances transactional efficiency owing to the economies of scale. Besides, doing business on an online platform eases information sharing in the value chain (Zhu 2004). The bad quality of information exchange between partners might result in inventory excess in the supply chain, a phenomenon called the “bullwhip effect”. Information exchange could lead to a more consistent information flow (Zhu 2004), and a better information flow would enable goods to deliver more efficiently in the supply chain (Mukhopadhyay et al. 1995), thus lowering the bullwhip effect. e-Business makes e-business value creation by enhancing transactional efficiency, widening the markets, and accomplishing information sharing and integration. On the one hand, Dyer and Singh (1998) argue that value creation includes complementarities in order to fill the lack of partners in the supply chain; on the other hand, firms in the network exchange information about best practices and new production manners that then result in refinement in the quality (Dyer & Nobeoka 2000). Close integration becomes a source of value to partners (Dyer & Singh 1998). Highly integrated partners could enable a provider to introduce and newer commodities speedily in reply to competitive trend (Saraf et al. 2007). Organizational integration is the mechanism by which e-business value is created and the role of organizational integration in fostering process efficiency is also well comprehended in the literature.

Most investigations implement or modify concepts about e-business value creation without explaining the intra and interfirm essence of e-business (Eikebrokk & Olsen 2007). One distinct exception is that of Amit and Zott (2001) who claim that no individual theory in the literature completely could clarify the potential of e-business value creation. They claim that of total IT-investments, e-business technologies have the greatest potential for value creation through connecting businesses, vendors, and customers in fresh and innovatory manners. They claim that value creation could be apprehended more completely by employing the business model as the measure of analysis. Four sub-constructs of value are recognized: efficiency, complementarities, lock-in, and novelty (Eikebrokk & Olsen 2007). This study adopts those and makes them as measurable variables. Efficiency/transaction efficiency is the cost per transaction, where cost is generally defined. Complementarities mean that the potential value of commodity and service conjunctions made possible by partners. Lock-in means that the value rooted in the cost suffered as switching to another supplier thereby fostering customers to stay with the existing business partner. Novelty refers to how e-business could create value through newness in the manner that business is managed.

Organizational integration is much harder to copy because its success calls for complementarities as supported by the resource-based theory. Although computers, networks, databases, and communication platforms constituting the kernel of a business’s entire IT infrastructure are product-like, the process of integrating those elements to evolve a consistent infrastructure adapted to a business’s strategic setting is still complicated and incompletely comprehended (Milgrom & Roberts 1990).

In sum, higher levels of organizational integration are supposed to foster increased e-business value. Vickery et al. (2003) present empirical evidence for a relationship between integration and customer

relationship management. This investigation identifies an eventful influence of supply chain integration on components of customer service for businesses. Likewise, Stank et al. (2001) identify organizational integration to positively affect e-business value creation. This brings about two hypotheses below.

H4. Firms with higher intrafirm integration have a positive influence on e-business value.

H5. Firms with higher interfirm integration have a positive influence on e-business value.

2.4 e-Business Value and Firm Performance

The final objective of e-business is to enhance the firm performance of the business. Such e-business value enabled by organizational integration might result in enhanced firm performance in operations excellence, customer relationship, and revenue growth (Rai et al. 2006; Soto-Acosta & Merono-Cerdan 2008). Therefore, the fundamental goal of this study is to investigate how e-business creates value through organizational integration to affect firm performance ultimately. This might not be the appropriate approach to examine e-business success although numerous researches have paid attention to an aggregated-dependent construct, that is, financial results (Ray et al. 2004). Testing the link between resources and capabilities concerning various processes within a business and its integral financial performance could result in fallacious deduction because businesses could have competitive advantage in certain business activities and competitive disadvantage in others (Soto-Acosta & Merono-Cerdan 2008). Ray et al. (2004) argue that testing the effectiveness of business processes as an approach. Another debate is that some IT investment might give advantages after a period of time but raise operating costs in the short run (Soto-Acosta & Merono-Cerdan 2008). Hence, employing financial performance at the macro level is senseless and could result in fallacious deduction. Scholars suggest a process-oriented way to conquer the above-mentioned confusing issues. The business process ought to be the fundamental level of analysis (Soto-Acosta & Merono-Cerdan 2008). Recent studies also support a viewpoint based on processes to conquer the foregoing issues in the literature on e-business (Subramaniam & Shaw 2002). Those debates result in the conclusion that a process-oriented approach should be employed to clarify the creation of firm performance enabled by e-business value, and this is the method adopted in this work. This study employs the effectiveness of operations excellence, customer relationship, and revenue growth to assess firm performance.

Operations excellence, customer relationship, and revenue growth are regarded as significant sub-constructs of firm performance (Rai et al. 2006). Operations excellence is defined as a business's responsiveness to customers and refinements in output as opposed to its competitors (Rai et al. 2006). It has been noticed that businesses have to balance operating costs and service level performance according to lead times to fit customer demands (Fisher 1997). Furthermore, businesses have to fulfil market-centered performance (Malhotra et al. 2005) that includes customer relationship (Groves and Valsamakis 1998) and revenue growth (Kalwani & Naravandas 1995; Moorman 1995). Customer relationship concentrates on the link and loyalty between a business and its customers and the business's inner information about customer's predilection. Growth in revenues encompasses sales from current commodities and from new commodities and markets (Zahra & George 2002). There are some signs that e-business value influences the three sub-constructs of firm performance taken into account in this study. For instance, firms with greater transactional efficiency are more likely to lower operating costs and then achieve operations excellence. Similarly, firms with more lock-in tend to retain more current customers and then reach customer relationship. In the same manner, firms with much novelty are more likely to increase growth in revenues and then accomplish revenue growth. Finally, firms in the supply chain complementing mutually tend to result in the potential value of commodity and service combinations enabled by partners and then reinforce firm performance. Thus, the final hypothesis is developed as follow.

H6. e-Business value has a positive influence on firm performance.

3 RESEARCH METHODOLOGY

3.1 Research Design

A questionnaire is evolved for a single respondent on behalf of his or her business, cross-industrial data-collection endeavour with the SCM-related divisions as the measure of analysis. A single respondent on behalf of one business, cross-industrial design is preferred to sustain an acceptable response rate although a multiple-respondent on behalf of one firm, longitudinal research would provide a more robust foundation to assert hypothesized results (Saraf et al. 2007).

This study pays attention to large firms for the following argument. There is obviousness to suggest that large firms differ from small and medium sized businesses in the supply chain relationships, in virtue of greater budgets and distinctions in the power they employ in those relationships (Benton & Maloni 2005; Subramani & Venkatraman 2003; Lee 2004) Hence, this study would like to confine the investigation to one size level so as to avert the possibility of firm size having a confusing influence on the results although this study does not pay attention to issues of power.

SCM executives are selected for responding this questionnaire because this research model is framed in the supply chain setting. Particularly, most targeted respondents are middle-level executives; they are the professionals who are most probably to have rich information regarding operational details in supply chain. This adopts the key informant method, where the respondent within the business who is most well-informed about the facets of the subject is targeted (Sabherwal & Chan 2001; Wall et al. 2004). This questionnaire holds the questions as general as possible to make sure that a single respondent could respond precise answers to all questions. A pretest of this questionnaire is conducted with several professors who major in supply chain and practitioners who work in Dell, Kimberly-Clark, and Taiwan Semiconductor Manufacturing Company (TSMC) in order to provide an additional reality examination of research model and a check of the relevance, wording, and response format of the indicators. The results of those processes lead to the final questionnaire.

3.2 Measures

Most of the instruments are adjusted from previous literature as shown in Table 1. Those instruments are further improved before completing the survey scale during pretests and face-to-face interviews with professionals. All indicators are estimated on a five point Likert-type scale applying integers from 1 to 5 symbolizing responses of “totally disagree” to “totally agree” for all indicators.

Scale indicators	Literature sources
IT integration capability	(Rai et al. 2006)
<i>Data consistency</i>	
Automatic data capture systems are used across the supply chain	
Definitions of key data elements are common across the supply chain	
Same data stored in different databases across the supply chain is consistent	
<i>Cross-functional integration of SCM system applications</i>	
Supply chain planning applications for accessing related information	
Supply chain transaction applications for accessing related information	
Supply chain transaction applications with internal applications of focal firm for accessing related information	
Customer relationship applications with internal applications of focal firm for accessing related information	
e-Business technologies usage	(Zhu & Kraemer 2005)
Conducting business online	
Customers sales conducted online	
Business-to-business sales conducted online	
Goods for resale ordered online	
Supplies and equipment for conducting business ordered online	
Intra-organizational integration	(Sanders 2007)
Cross-functional integration in strategic planning	

Utilization of integrated database for information sharing
Sharing of operations information among departments

Inter-organizational integration

(Sanders 2007)

Real-time sharing of operations information with suppliers
Real-time sharing of cross-functional processes with suppliers
Engagement in collaborative planning with suppliers
Sharing cost information with suppliers

e-Business value

(Eikebrokk & Olsen 2007)

Efficiency

Costs reduced by electronic order taking over the Internet
Able to deliver faster
Costs reduced in communication with suppliers and customers

Complementarities

Our products or services complement products or services from other suppliers
Other suppliers complement our products or services
Our supply chain strongly integrates our partners' supply chains

Lock-in

It is more expensive for our customers or suppliers to replace us
Our products and services are more suitable to our customers' needs

Novelty

Our company is a pioneer in utilizing e-business solutions
We cooperate with our customers or suppliers in new and innovative ways

Firm performance

(Rai et al. 2006)

Operations excellence

Product delivery cycle time
Timeliness of after sales service
Productivity improvements

Customer relationship

Strong and continuous bond with customers
Precise knowledge of customer purchasing patterns

Revenue growth

Increasing sales of existing products
Finding new revenue streams

Table 1. Scale indicators and literature sources

3.3 Data Collection

Data collection for this investigation is largely in the manufacturing industry. A sample was acquired from a database of member companies of the Information Management Association (IMA). The sample includes Taiwan top 1000 businesses in 2010 whose ranking is in the light of sales. Most respondents differ from their titles, and include president, CEO, CIO, CTO, vice president, director, and senior manager as shown in Table 2. The job titles of the respondents present the good quality of the data source. Data are collected through questionnaires mailed to 2010 top 1000 businesses in Taiwan and 248 responses are received. The overall response rate is 24.8% which is comparable to other studies of similar instrument (Byrd & Turner 2001; Wisner 2003). Table 2 exhibits the characteristics of the sample. Harman's one-factor test is used to examine the common method bias (Podsakoff & MacKenzie & Lee & Podsakoff 2003). Those tests do not inspect any significant biases in sample that result from the survey methodology.

	Frequency	Percentage
Respondent title		
President	2	0.8
CEO/CIO/CTO	8	3.2
Vice president	4	1.6
Director/planner	162	65.3
Senior manager	40	16.2
Others	32	12.9
Industry		
Manufacturing	148	59.7
Construction	12	4.8
Commerce(wholesale/retailing/trading)	16	6.5
Transportation/ logistics	22	8.9
Services	32	12.9
Others	18	7.2
Total	248	100

Table 2. Sample characteristics (N = 248)

4 THE EMPIRICAL ANALYSIS

4.1 Analysis of Construct Reliability

Construct Reliability estimates the level to which items are free from random error and then produce consistent results (Zhu & Kraemer 2005). In this measurement instrument, all constructs have a composite reliability over the minimum threshold of 0.70, as recommended by Straub (1989). Cronbach's coefficient alpha is computed to determine construct reliability as well. All Cronbach alpha levels are above 0.70, where 0.70 is the recommended minimum threshold for established scales (Sanders 2007). Cronbach alpha levels of each construct range from 0.77 to 0.94 and composite reliability levels range from 0.81 to 0.91 as presented in Table 3.

Construct	Mean	Standard deviation	Cronbach's α reliability	Composite reliability	Average variance extracted
IT integration capability	4.15	0.66	0.88	0.83	0.61
e-Business technologies use	3.21	0.79	0.78	0.81	0.69
Intrafirm integration	4.06	0.71	0.77	0.84	0.64
Interfirm integration	3.14	0.93	0.91	0.87	0.77
e-Business value	3.38	0.77	0.94	0.89	0.74
Firm performance	3.61	0.77	0.93	0.91	0.78

Table 3. Descriptive statistics, Cronbach's alpha reliability, composite reliability, and average variance extracted

4.2 Analysis of Construct Validity

The results from the empirical analysis support the convergent and discriminant validity of constructs as exhibited in Table 3 and Table 4. Convergent validity is the extent to which the items under each construct measure the same underlying construct. Two approaches are used to evaluate convergent validity. One is to assess whether the individual item's factor loading on its corresponding construct from the measurement model is greater than 0.55 (Teo et al. 2008). All items have a loading above the recommended threshold. Another way to assess convergent validity is to evaluate the average variance extracted (AVE) for each construct. The AVE of the individual construct mirrors the ratio of the construct's variance to the total variances among the items of the construct. Table 3 indicates all AVEs are above the 0.5 threshold recommended by Fornell and Larcker (1981).

Discriminant validity is the degree to which an individual construct differs from other constructs (Sanders 2007). There are two approaches using to evaluate discriminant validity as well. One is inter-factor correlations calculated for all factors and exhibited in Table 4. An analysis of Table 4 discloses the inter-factor correlations to be low. Another way is that discriminant validity is satisfied as all items loaded more intensively on its corresponding constructs rather than on other constructs. It is noted that no cross-loadings for any individual construct items and cross-loadings with other constructs are less than all construct-specific loadings in this research, which supports the convergent/discriminant validity of major constructs.

	IT integration capability	e-Business technologies use	Intrafirm integration	Interfirm integration	e-Business value	Firm performance
IT integration capability	1.00					
e-Business technologies use	0.28	1.00				
Intrafirm integration	0.33	0.28	1.00			
Interfirm integration	0.36	0.34	0.32	1.00		
e-Business value	0.31	0.32	0.34	0.43	1.00	
Firm performance	0.29	0.39	0.41	0.38	0.41	1.00

Table 4. Correlation table (N = 248)

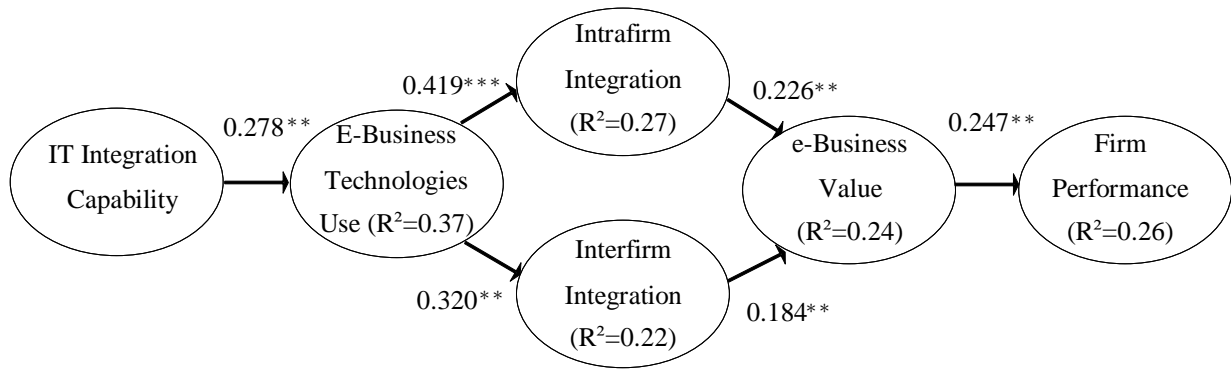
4.3 Structural Equation Modeling

The significance of the path coefficients in the research model are assessed using the CALIS procedure of SAS 8.01 program and are illustrated in Figure 2. The findings identify broad support for all hypothesized results in the research model. All paths are statistically significant at the 0.05 level. IT integration capability is identified to foster e-business technologies use (H1). Of the two constructs of the organizational integration, this study indicates that intrafirm/interfirm integration enabling by e-business technologies use are positively linked with e-business value creation (H2, H3, H4, H5). Eventually, firm performance would be enhanced once e-business value is created (H6).

Goodness-of-fit measure	Acceptable value	Model value
Chi-square/degree of freedom	≤ 3.00	2.96
Goodness-of-fit index (GFI)	≥ 0.90	0.91
Adjusted goodness-of-fit (AGFI)	≥ 0.80	0.83
Normalized fit index (NFI)	≥ 0.90	0.91
Non-normalized fit index (NNFI)	≥ 0.90	0.94
Comparative fit index (CFI)	≥ 0.90	0.93
Root mean square error of approximation (RMSEA)	≤ 0.10	0.08

Table 5. Goodness-of-fit measures of the research model

Table 5 exhibits some goodness-of-fit statistics to evaluate how well-specified models account for the observed data. Five incremental fit indices are all above the preferred level (Gefen et al. 2000). In sum, the overall fit statistics, reliability, and validity analyses enable the confirmation of the research model.



Significant at: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Figure 2. The results in research model for creating e-business value and firm performance

5 CONCLUSIONS

It is particularly significant and necessary for modern businesses to achieve sustainable development and growth through the use of e-business technologies. Therefore, this study conducts the survey to explore the use of e-business technologies applied by firms which included the investigation of significant capability as companies using e-business technologies and the inspection of e-business value affecting firm performance through intra/interfirm integration. In the overall research findings, the results of this study could be as the reference for academia and practitioners as conducting related researches and provide businesses with required capability and knowledge as employing e-business technologies and finally identify the optimal way at the right time for businesses in order to reduce the likelihood of failure while drawing on e-business technologies. It implies that there is a guideline to follow for firms and the research model would contribute to enhance the success of e-business value and firm performance for businesses so as to increase the overall competitiveness of industries in the long run.

This study has deeply investigated and extensively reviewed the related reference of significant capability affecting the use of e-business technologies by businesses based on the research findings and processes completed in this study. In addition, this work also has examined the relevant documents of e-business technologies use and e-business value, and identified two significant mediators within this relationship which exist intrafirm/interfirm integration. In the end, the research model has developed the measurement for firm performance. The constructs of IT integration capability and e-business value proposed in this study not only could be regarded as the basis for organizations using e-business technologies in the future but also served as the managerial instruments in practices.

Throughout all the findings accomplished by this study, there are some suggestions as follows:

- The practitioners in the past explored the use of e-business technologies often ignore the antecedent of “capability” which is much more important determinant. Using any new IT for businesses might require new capability (Morris & Venkatesh 2010) but the prior researches usually omit this concept. Raman et al. (2006) argue that capability play an important role in e-business implementation. Saini and Johnson (2005) also verify that capability is particularly essential as seeking better e-business performance.
- Melville et al. (2004) have demonstrated that IT use might not have a positive influence on firm performance directly, but the improvement of organizational processes performance internal and external might affect the final firm performance. That is to say, e-business technologies influencing the enhancement of firm performance is indirect. Thus, prior studies explored IT-firm

performance yield inconsistent results due to the omission of significance of process performance over a long period of time (Iyer et al. 2009).

- e-Business technologies is a integrative system applications which link customers, employees, business partners, and suppliers. It should explore whether the company has integrated its technologies with the capability is more appropriate when it comes to e-business.
- As Melville et al. (2004) suggested, SCM is getting more and more necessary for businesses nowadays and a good quality of SCM is also the ultimate goal that firms endeavor. SCM is highly integrative, consistent, and across divisions/organizations in nature. Complementarities need to be established in order to enable potential value of commodity and service conjunctions by partners. In other words, intra/interfirm integration might be seen as the form of complementarities among organizations in the supply chain.

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