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# Factors Affecting E-Business Diffusion in Organizations: Differences between Developed and Developing Countries

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## ABSTRACT

Grounded in the innovation process model and the technology-organization-environment framework, we develop a research model to investigate factors influencing e-business diffusion in organizations. We formulate a series of hypotheses associated with seven contextual factors (technology readiness, technology integration, firm size, global scope, managerial obstacle, competition intensity, and regulatory environment) that may shape organizational assimilation of e-business. The research model is tested using survey data (1,857 firms) collected in three major industries from ten countries. Based on structural equation modeling, our empirical analyses have identified contextual factors that may have varying effects at different assimilation stages and in different economic environments. The paper concludes with a discussion on major findings and implications.

## Keywords

Assimilation Process, E-Business, Technology Diffusion, Technology-Organization-Environment Framework, Cross-Country Study

## INTRODUCTION

Skepticism about the value of information technology (IT) has been renewed in recent years (Carr, 2003), partly due to the gap between increased firm spending on IT – particularly on Internet-related technologies – and the widespread perception about the lack of value from electronic business<sup>1</sup>. To study the renewed IT paradox, recent research has examined the relationship between IT investments and business performance in the Internet environment (McKinsey and Company, 2002). However, merely examining the dollars invested in Internet technologies cannot reveal the reach and richness of technological innovations, as IT capital alone cannot explain the variations of e-business usage (Fichman, 2000).

Indeed, a multi-stage process seems to exist before the business value of IT can be realized. This process includes intermediary stages such as initiation, adoption, and usage (DeLone and McLean, 1992). A recent study has shown that organizational usage and assimilation of IT may be an important link to IT payoff, but this link seems to be “missing” in the literature (Devaraj and Kohli, 2003). Clearly, there is a need to investigate this process and reveal factors influencing IT assimilation along the process, which seems to be a promising path to resolve the renewed “productivity paradox.”

This study seeks to facilitate our understanding of factors influencing organizational assimilation of e-business. Key research questions that motivate our work are: (1) What theoretical framework can be used to study the process of e-business assimilation? (2) What factors can be identified within the theoretical framework, and how do these factors shape various stages of the assimilation process? (3) How would the patterns of e-business assimilation vary across different economic

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<sup>1</sup> This study defines electronic business (e-business) as using the Internet to support or conduct business activities along the value chain, including sales, post-sales support and services, procurement, and value chain coordination.

environments (e.g., developed vs. developing countries)? To better understand these issues, we developed a conceptual model based on the innovation process model and the technology-organization-environment framework, and tested it using survey data of 1,857 firms in three major industries from ten countries (both developed and developing countries). We used structural equation modeling to test the model. The results identified significant factors shaping e-business assimilation in general, but demonstrated varying effects at different stages and across different economic environments.

The following section introduces theoretical development. Several research hypotheses are then formulated, followed by research methodology, analysis, and results. The paper concludes with a discussion of research findings, limitations, and implications for both research and management.

**THEORETICAL DEVELOPMENT**

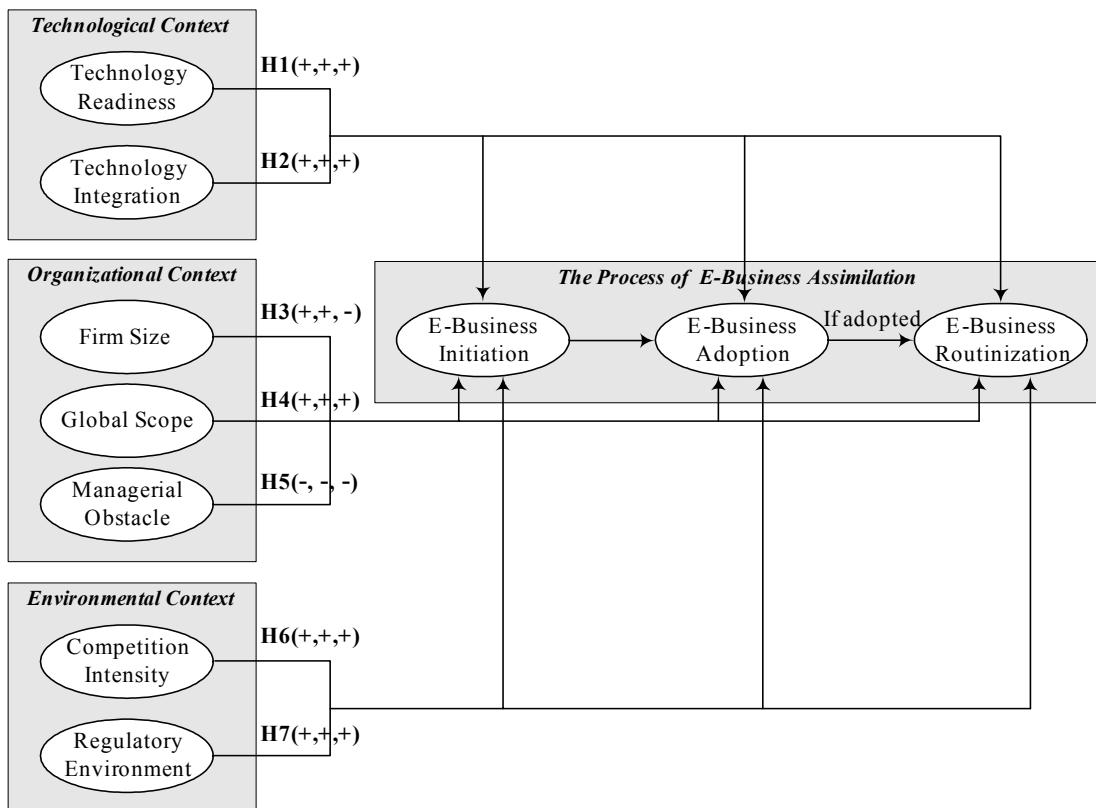
**The Process of Innovation Assimilation**

To capture the major phases in the process of innovation assimilation in organizations, Thompson (1965) posited a three-stage model consisting of *initiation*, *adoption*, and *routinization*. Drawing upon this framework for innovation assimilation, we specify three stages to describe the process by which firms assimilate e-business:

- *E-business initiation*: firms evaluate the potential benefits of e-business (Rogers, 1995);
- *E-business adoption*: firms make the decision to use the Internet for business activities along the value chain (Chau and Tam, 1997); and
- *E-business routinization*: e-business becomes an integral part of routine business activities (Amstrong and Sambamurthy, 1999; Chatterjee, Grewal and Sambamurthy, 2002).

**The Context for Innovation Assimilation**

To study the contextual factors that influence the innovation process, Tornatzky and Fleischer (1990) developed the *technology-organization-environment* (TOE) framework, which identified three aspects of a firm’s context that influence the process by which it adopts and implements technological innovations: (1) *Technological context* describes both the internal



**Figure 1. The Conceptual Model**

and external technologies relevant to the firm. This context includes existing technologies inside the firm, as well as the pool of available technologies in the market. (2) *Organizational context* is typically defined in terms of several descriptive measures: firm size, scope, managerial structure, and the amount of slack resources available internally. (3) *Environmental context* is the arena in which a firm conducts its business—its industry, competitors, and dealings with government (Tornatzky and Fleischer 1990: 152-154). The technology-organization-environment framework is consistent with Rogers' (1995) theory of innovation diffusion, and has consistent empirical support from the literature (e.g., Chau and Tam, 1997; Iacovou, Benbasat and Dexter, 1995; Thong, 1999; Zhu, Kraemer, Xu and Dedrick 2004).

Grounded in the TOE framework, we posit three sets of variables – technological, organizational, and environmental – as influential factors that may shape e-business assimilation process. Within the technological context, we study firms' technological basis for launching e-business measured by technology readiness (Kwon and Zmud, 1987), and firms' deeper strategy of using technologies reflected by technology integration (Zhu and Kraemer, 2002). Within the organizational context, we include two of the major organizational attributes—size and scope, and study an organizational attribute particularly important for e-business—managerial obstacle (Chircu and Kauffman, 2000). Within the environmental context, we examine industry competition—one of the most widely studied environmental factors in the innovation diffusion literature (Gatignon and Robertson, 1989). We also incorporate government regulation, considering that e-business is an emerging IT innovation and needs regulatory support (Kraemer, Gibbs and Dedrick, 2002).

Combining the three-stage process model and the TOE framework, we develop a conceptual model as shown in Figure 1. Next, we will form a series of hypotheses associated with this model.

## HYPOTHESES

### Technological Context

We define *technology readiness* as consisting of technology infrastructure and IT human resources. Technology infrastructure refers to technologies that enable Internet-related businesses. IT human resources refer to IT professionals possessing skills to implement Internet-related applications (Kwon and Zmud, 1987; Thong, 1999). Firms with a higher degree of technology readiness are more likely to initiate, adopt, and routinize e-business (Iacovou et al., 1995; Zhu et al., 2004). Thus, we put forward the following hypothesis:

*H1: Technology readiness is positively related to e-business initiation, adoption, and routinization.*

Beyond technology readiness, we examine *technology integration*, which refers to the extent of inter-connection among IT systems and databases within and beyond firm boundaries. Technology integration represents firms' ability to effectively convert the common technologies into IT capabilities (Zhu and Kraemer, 2002). Technology integration is critical for e-business, because e-business systems should be able to monitor the order status along the fulfillment process, and to automatically communicate order changes in downstream processes or systems, e.g., inventory and manufacturing systems (Zhu et al., 2004). Therefore, firms with an integrated technology base tend to enjoy advantages in initiating e-business innovations, and are more likely to achieve a smooth implementation. Thus, we propose the following hypothesis:

*H2: Technology integration is positively related to e-business initiation, adoption, and routinization.*

### Organizational Context

*Firm size* refers to the number of employees in the organization, a definition widely used in the literature (e.g., Thong, 1999). The role of firm size may be distinct at different stages in the assimilation process: Conducting e-business requires various firm resources, e.g., financial, technical, and managerial resources (Chircu and Kauffman, 2000). Thus, large firms are more likely to initiate and adopt e-business innovations given their resource advantages (Nohria and Gulati, 1996). Yet, to assimilate e-business initiatives, senior executives, business managers, and IS managers need to interact on a regular basis and achieve tight collaboration (Chatterjee et al., 2002). Also, many e-business innovations are associated with business process redesign and organization restructuring (Chatterjee et al., 2002; Fichman, 2000). In this regard, small firms enjoy flexibility and agility, and thereby are more likely to achieve e-business routinization. These considerations lead to the following hypothesis:

*H3: Firm size is positively related to e-business initiation and adoption, but negatively related to routinization.*

We choose *global scope* as one organizational factor, since e-business is a global phenomenon and our study is cross-country in nature. Global scope refers to the extent of business expansion into the international market. In general, companies may face a steep rise in transaction costs when they expand into heterogeneous market segments (Gurbaxani and Whang, 1991). Since e-business can help lower transaction costs and search costs (Garicano and Kaplan, 2001), and reduce market friction through increased information transparency (Malone, Yates and Benjamin, 1987), firms with greater global scope tend to

have greater incentives to use e-business. Thus, we expect that global scope is positively associated with e-business assimilation:

*H4: Global scope is positively related to e-business initiation, adoption, and routinization.*

Further, our study seeks to examine the impact of *managerial obstacles* on e-business assimilation as motivated by prior research on IT and e-business usage (Armstrong and Sambamurthy, 1999; Chircu and Kauffman, 2000). Prior studies have shown that innovating firms must possess managerial knowledge, skills, and championship in order to achieve innovation assimilation (Chatterjee et al., 2002). On the other hand, without sufficient managerial support, firms can hardly achieve a smooth assimilation process (Purvis et al., 2001). We posit managerial obstacles as a barrier to e-business assimilation, which refers to the lack of managerial capabilities to integrate e-business into the overall business strategy and to redesign the organizational structure to accommodate e-business. Thus, we form the following hypothesis:

*H5: Managerial obstacles are negatively related to e-business initiation, adoption, and routinization.*

### **Environmental Context**

*Competition intensity* has long been recognized as an important factor for innovation diffusion (Gatignon and Robertson, 1989; Iacovou et al., 1995). It refers to the degree that a company is affected by competitors in the same market. Competition may drive organizational innovation to maintain a competitive edge (Gatignon and Robertson, 1989). Thus, we expect a positive association between competitive pressure and e-business assimilation:

*H6: Competition intensity is positively related to e-business initiation, adoption, and routinization.*

Within the TOE framework, the regulatory environment has been recognized as a critical environmental factor affecting innovation diffusion (e.g., Tornatzky and Fleischer, 1990). Recent studies indicated that the regulatory environment played an important role in promoting e-business usage by firms (Kraemer et al., 2002). Governments can facilitate e-business diffusion by regulating the Internet to make it a trustworthy business platform (e.g., dealing with fraud and credit card misuse), and establishing supportive business and tax laws to protect e-business transactions. The regulatory support may stimulate e-business usage. Thus, we form our final hypothesis as follows:

*H7: A supportive regulatory environment is positively related to e-business initiation, adoption, and routinization.*

## **RESEARCH DESIGN**

### **Data and Sample**

To test the research model and the associated hypotheses discussed above, we designed a questionnaire and conducted a large-scale survey in three major industries (manufacturing, retail/wholesale distribution, and financial services) in ten countries. The survey questionnaire was designed based on a comprehensive literature review and interviews of managers, and was refined via several runs of pretests, revisions, and pilot tests. Each of the items on the questionnaire was reviewed by an expert panel for its content, scope, and purpose (content validity). The survey was executed by International Data Corporation (IDC), a professional research institution that specializes in large-scale surveys and has accumulated considerable experience and a well-connected network of corporate executives in multiple countries.

The survey was conducted during the period of February–April 2002. The sampling was a stratified sample by country and firm size, with sites selected randomly within each size cell to minimize bias. The sample frame was obtained from a list source representative of the entire local market. After we received the dataset, we further checked for consistency of the data and extreme values of key variables. After outliers have been dropped, our final dataset contains 1,857 respondents. Table 1 shows the sample characteristics.

As shown in Table 1, distribution of firm size reflected a balance of large and small businesses. Using ANOVA, we found that there was no statistically significant bias regarding size distribution across countries. We compared responses between IS managers and non-IS managers, and found no significant bias caused by respondents' positions. We also examined the so-called "common method bias" (Podsakoff et al., 2003), as potentially occurring in survey data. The results of statistical tests suggested that there was no significant bias in our dataset resulted from the survey methodology.

### **Cross-Country Comparison**

Given that e-business is a global phenomenon, we believe it is important to consider the international dimension of e-business assimilation (Dewan and Kraemer, 2000). Several environmentally imposed obstacles that managers face in implementing information technology in less developed countries were identified, including a scarcity of managerial, technical, and financial resources at the firm level, the inadequacy of basic infrastructure at the national level (Dewan and

Kraemer, 2000), and other institutional factors such as culture and regulation (Kraemer et al., 2002). These discussions motivated us to investigate how different economic environments shape the process of e-business assimilation. To this end, we designed a cross-country comparison between developing countries and NICs (Brazil, China, Mexico, Singapore, and Taiwan,  $N=854$ ) and developed countries (Denmark, France, Germany, Japan, and the United States,  $N=1003$ ).

Category	Percentage	Category	Percentage
<b>Country</b>		<b>Industry</b>	
Brazil	8.5	Manufacturing	35.6
China	9.7	Retail / wholesale distribution	31.4
Taiwan	8.9	Financial services	33.0
Denmark	9.0	<b>Number of Employees</b>	
France	9.6	<50	18.8
Germany	9.6	50 - 100	16.1
Japan	11.1	100 - 200	14.3
Mexico	9.2	200 - 300	19.9
Singapore	9.6	300 - 500	14.0
United States	14.8	>500	16.8
<b>Annual Revenue (\$ million)</b>		<b>Respondent Title</b>	
<1	5.4	President, Owner, Managing Director, CEO	3.3
1 - 10	21.8	CIO/CTO/VP of IS	16.9
10 - 50	25.7	IS Manager, Director, Planner	34.9
50 - 100	10.7	Other Managers in IS Department	21.6
100 - 500	19.5	Business Operations Manager, COO	4.6
500 - 10000	6.4	Administration/Finance Manager, CFO	8.2
> 1000	10.5	Others (Marketing VP, Other Managers)	10.4

**Table 1. Sample Characteristics**

### Construct Operationalization

We briefly describe how model constructs are measured. E-Business Initiation was measured by asking respondents their evaluations on e-business benefits prior to their adoption, including cost reduction, market expansion, and value chain coordination. To measure E-Business Adoption, we asked respondents whether their firms have used the Internet for value chain activities including marketing and sales, after-sales services, inbound logistics, and outbound logistics (Porter, 1985). E-Business Routinization was measured by the percentages of total sales to consumers, total sales to business, total services to consumers, total services to business, and total procurement that have been conducted online (Chatterjee et al., 2002).

Technology Readiness was measured by the number of personal computers per employee (Thong, 1999), e-business-related technologies in use at the establishment (e.g., EDI, EFT, Intranet, and Extranet) (Zhu et al., 2004), and the total number of IT professionals at the establishment. Technology Integration was measured by the extent to which Internet systems are connected with back-office systems and databases, and the extent to which company databases are linked to business partners' systems and databases (Zhu and Kraemer, 2002).

Firm Size was measured by the number of employees (logarithm-transformed) (Thong, 1999). Global Scope has two dimensions – geographic scope and trading globalization. Geographic scope was measured by the number of global sites and headquarters, while trading globalization was measured by the percentage of total sales and procurement from the international market. Managerial Obstacles were operationalized by managers' perceived difficulty to integrate e-business into the overall business strategy and adjust organization structure to accommodate e-business usage, and by the extent to which establishments lack staff with e-business managerial expertise (Chircu and Kauffman, 2000).

Competition Intensity was measured by three items related to the rivalry among existing competitors in the local, national, and international markets (Porter, 1985), which have been used in the IT literature (Thong, 1999). Regulatory Environment

was measured by four items, including adoption incentive provided by the government, requirement in government procurement, legal protection for Internet purchases, and supportive business laws for doing e-business (Kraemer et al., 2002).

**DATA ANALYSIS AND RESULTS**

We used structural equation modeling (SEM) for data analysis, as implemented in AMOS 4.0. We conducted a two-step analysis to first assess the measurement mode, and then test the hypotheses by fitting the structural model (Straub, 1989).

**Results of the Measurement Model**

To evaluate our measurement model, we assessed construct reliability, convergent validity, and discriminant validity. Most constructs in our model have a composite reliability over the cutoff of 0.70 as suggested by Straub (1989), while one construct has a lower composite reliability of 0.65, which is deemed marginally acceptable (Hair et al., 1998). In our measurement model, all estimated standard loadings are significant ( $p < 0.001$ ) and of acceptable magnitude, suggesting good convergent validity (Hair et al. 1998). To test discriminant validity, we used Fornell and Larcker’s (1981) criteria: The square root of the Average Variance Extracted (AVE) should be greater than the absolute value of inter-construct correlations. Such results suggest that the items share more common variance with their respective constructs than with other constructs. All of our constructs meet this criterion.

**Results of the Structural Model**

The standardized paths and various model-fit indices of the structural model are shown in Table 2. To assess the overall fit of the structural model, we examined five incremental fit indices—normed fit index (NFI), relative fit index (RFI), incremental fit index (IFI), Tucker-Lewis index (TLI), and comparative fit index (CFI). All the incremental fit indices are above the conventional cutoff of 0.9 (Hair et al., 1998). We examined one parsimonious fit index, root mean square error of approximation (RMSEA). Our model has an RMSEA of 0.062, with the test of  $RMSEA < 0.08$  being insignificant, suggesting a fair model fit (Hair et al., 1998). The three dependent variables, e-business initiation, adoption, and routinization, have  $R^2$  of 29%, 39%, and 35%, respectively. The data variation explained in our model is deemed satisfactory. In summary, using various model fit indices, we have verified that our model has a good fit with the empirical data.

To test each hypothesis, we examined the sign and the significance of path estimates (Table 2). A significant and positive path suggests the role of an initiation/adoption/routinization facilitator; while a significant and negative path suggests a barrier. Thus, drawing upon the empirical results, we found significant support for H1 (technology readiness) and H2 (technology integration), and partial support for H5 (managerial obstacle) and H7 (regulatory environment). However, H3 (firm size), H4 (global scope), and H6 (competition intensity) are not supported by our analyses.

	Initiation	Adoption	Routinization
Technology Readiness	0.20 ***	0.47 ***	0.48 ***
Technology Integration	0.25 ***	0.33 ***	0.32 ***
Firm Size	-0.02	-0.12 ***	-0.14 ***
Global Scope	-0.03	0.03	-0.01
Managerial Obstacle	-0.14 ***	-0.02	-0.08 **
Competition Intensity	0.10 ***	0.04 ***	-0.06 **
Regulatory Environment	0.34 ***	0.03	0.10 ***
Initiation		0.13 ***	
$R^2$	29%	39%	35%
NFI, RFI, IFI, TLI, CFI	0.95 - 0.97		
RMSEA ( $p$ -value <sup>†</sup> )	0.062 ( $p > 0.10$ )		

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ .

† P-value for the test of a fair model fit ( $RMSEA < 0.08$ )

**Table 2. SEM Results: Full Sample**

**Results of the Cross-Country Comparison**

Then, we fit our model on developing countries and NICs and developed countries respectively. The results are shown in Table 3. Again, various fit indices show that our model has satisfactory fit on each subsample. However, different patterns of contextual influences in the process of e-business assimilation have been identified across developed and developing countries. Findings based on these analyses will be discussed in the next section.

	Developed Countries			Developing Countries & NICs		
	Initiation	Adoption	Routinization	Initiation	Adoption	Routinization
Technology Readiness	0.04	0.29 ***	0.18 **	0.30 ***	0.69 ***	0.78 ***
Technology Integration	0.39 ***	0.25 ***	0.36 ***	0.14 ***	0.32 ***	0.30 ***
Firm Size	-0.15 **	-0.13 **	-0.13 *	0.03	-0.26 ***	-0.35 ***
Global Scope	0.16 **	0.06	-0.03	-0.17 *	-0.08	0.03
Managerial Obstacles	-0.16 ***	-0.03	-0.04	-0.11 **	-0.05	-0.16 ***
Competition Intensity	0.15 ***	0.06 **	0.03	0.03	-0.10 **	-0.22 ***
Regulatory Environment	0.18 ***	0.02	0.05	0.34 ***	0.14 ***	0.10 *
Initiation		0.26 ***			-0.02	
R <sup>2</sup>	34%	41%	22%	24%	46%	56%
NFI, RFI, IFI, TLI, CFI	0.95 - 0.96			0.96 - 0.98		
RMSEA (p-value <sup>†</sup> )	0.062 (p > 0.10)			0.056 (p > 0.10)		

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10. † P-value for the test of a fair model fit (RMSEA < 0.08)

**Table 3. SEM Results: Developed Countries vs. Developing Countries & NICs**

**DISCUSSIONS**

**Major Findings**

**Finding 1:** *Technology integration emerges as the strongest factor in developed countries, which suggests that as e-business evolves, the key determinant of organizational assimilation of e-business shifts from accumulation of individual technologies to integration of these technologies.*

In developing countries, *technology readiness* is the most critical factor among all seven factors, suggesting that basic technology infrastructure is still highly important for the assimilation process in these countries. In contrast, *technology integration* becomes the strongest factor in developed countries. Thus, the difference between the two subsamples suggests that, as e-business evolves, the key determinant of organizational assimilation of e-business shifts from the use of common technologies to deeper strategies to deploy them, especially technology integration that helps to leverage existing information resources and databases across key processes in the firm and the value chain (Zhu and Kraemer, 2002).

**Finding 2:** *Large firms are less likely to achieve e-business assimilation, suggesting that possible structural inertia associated with firm size may retard e-business transformation.*

Within the organizational context, our study revealed the negative influence of firm size on e-business assimilation. In general, large firms may have more fragmented IT legacy systems built over long periods of time. Changes in large firms are often complicated by entrenched organizational structure and hierarchical decision making (Nord and Tucker, 1987). These factors may translate into structural inertia that tends to retard their digital transformation, as suggested by our results.

**Finding 3:** *The effect of global scope on e-business assimilation is determined by its interaction with technology integration, suggesting the role of global scope as a structural resource to moderate e-business assimilation.*

The empirical results do not support our hypothesis for global scope. To get a deeper understanding of the effect of global scope, we further performed hierarchical regressions of the factor score of routinization against factor scores of technology integration and global scope, as well as their multiplication (see Table 4). The regression model showed a strong and significant interaction effect (b=0.32\*). This seems to suggest that, to sufficiently capture the benefits of Internet innovations



in facilitating transactions, it is particularly important for firms with greater scope to integrate and streamline various IS applications across business function sites and global partners.

	Routinization	Routinization
Technology Integration	0.39***	0.27***
Global Scope	-0.01	-0.29
Technology Integration × Global Scope		0.32*

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ .

**Table 4. The Interaction Effect on E-Business Routinization**

**Finding 4:** *Competition drives e-business initiation and adoption, but not routinization, which seems to suggest that the deeper stage of e-business assimilation relies more on internal resources than external pressure.*

Prior studies found that competitive pressure increased firms’ incentives to seek new technology innovations so as to maintain a competitive edge (Gatignon and Robertson, 1989). Our study shows that when firms confront strong market competition, they tend to adopt e-business more aggressively. Yet, its effect on deeper usage (routinization) is very different (Zhu et al., 2004). This supports our theoretical expectation that *the same factor may play different roles in different stages of e-business transformation and in different environments.*

**Finding 5:** *Regulatory environment plays a more important role in developing countries than in developed countries.*

Comparing the developed and the developing samples, we find that government regulation is more important for e-business assimilation in developing countries. Markets in most developing countries are characterized by information asymmetry, imperfections, and immature institutional structure (Dewan and Kraemer, 2000). Thus, government regulation (e.g., regulating monopoly power and dealing with e-business fraud) tends to play a greater role in developing countries (Kraemer et al., 2002). *Together with the varying effects of other factors such as technology readiness and competition intensity across developed and developing samples, this finding confirms that economic environments shape e-business assimilation.*

**Limitations and Future Research**

Our methodology required tradeoffs that may limit the use of the data and the interpretation of the results. Because our dataset is cross-sectional in nature, we can only show associations but cannot analyze longitudinal processes, such as the evolution of technology integration. To investigate the dynamic nature of e-business usage, a longitudinal research design is needed. This study focused on e-business assimilation, but did not examine the issue of e-business value. To demonstrate a holistic view of e-business usage, studying value creation is very important.

We hope our research also has implications for other researchers. Through successive stages of theoretical modeling and empirical testing, we developed a research model by integrating the theory of innovation process (Thompson, 1965) with the framework of innovation contexts (Tornatzky and Fleischer, 1990). This integrated model investigates e-business assimilation from a process orientation (including initiation, adoption, and routinization), which has not been sufficiently captured in the existing literature. Our research model as a whole has a good fit with empirical data. Data analyses confirmed the usefulness of integrating the process model and the TOE framework for studying the process of e-business assimilation. Hence, our theoretical development could serve as a basis for other researchers to study innovation contexts and innovation assimilation.

**Managerial Implications**

Our study provides several implications for managers. The results offer a useful framework for managers to assess the technological conditions under which e-business is launched. To ensure smooth implementation and routinization, firms need to foster capabilities to enhance technology integration. Also, this study suggests that managers need to adjust their management practices at different assimilation stages. For instance, at the initiation stage, large firms tend to enjoy resource advantages, but they have to overcome structural inertia at later stages. In addition, our results point to the need for establishing a legal and institutional framework that supports online transactions. This implication for policy makers is particularly important at the early stages of e-business development in an economy.

## CONCLUDING REMARKS

To resolve the renewed debate on IT payoff, it is important for researchers to investigate organizational usage and assimilation of IT innovations, which yet seems “missing” in the existing literature (Devaraj and Kohli, 2003). The process of IT assimilation requires more study because less is known about it. We conducted systematic tests of influential factors at three stages of the e-business assimilation process. Based on a large-scale dataset, our analyses have identified contextual factors that may have varying effects at different assimilation stages and in different economic environments.

Unlike most of the studies in the literature, our study is not limited to one particular country. The broad dataset of 1,857 firms from ten countries allowed us to examine how economic environments influence e-business assimilation. Because the sample included developed, developing, and newly industrialized countries, the generalizability of our model and findings is strengthened. We hope our work will encourage more research in this important area.

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