Global Technology, Local Adoption: A Cross-Country Investigation of Internet Adoption by Companies in the United States and China

SEAN XU, KEVIN ZHU, AND JENNIFER GIBBS

INTRODUCTION

Electronic business (e-business or EB, defined as business activities conducted over the Internet) has been one of the most remarkable information technology (IT) innovations in the last decade. Despite the burst of the dot.com bubble, many companies, e.g., Cisco, Wal-Mart, and Capital One, continue to deploy e-business extensively in their enterprise value chains (Clemons and Hitt 2001; Kraemer and Dedrick 2002). Yet, with respect to the academic research, several gaps can be identified. First, firms face a series of obstacles in adopting e-business, particularly their ability to transcend significant technical, managerial, and cultural issues (IBM 2001; Sato et al 2001). Puzzled by the mixed evidence, researchers and practitioners are calling for studies investigating contexts for e-business adoption. However, the e-business research lacks reliable empirical data that are based on large-scale surveys and can show how contextual factors may shape e-business adoption.

Second, as shown by recent country-level statistics, e-business is spreading quickly in developing countries (UNCTAD 2002). Much
of the previous research, however, focused on companies in developed countries, predominantly in the United States. To the best of our knowledge, no cross-country studies have been conducted based on firm-level data from multiple countries. As a result, this area is lacking an overall view of the global diffusion of e-business among organizations. We believe that it is valuable to add an international dimension to the study of e-business, comparing e-business adoption in developed and developing countries.

Third, although e-business usage has been conceptualized as a complex procedure with potential applications in various value-chain processes (Kauffman and Walden 2000), much of the existing research on e-business adoption has been restricted to a dichotomous measure of ‘adoption vs. non-adoption’. Although this is helpful to understand adoption decisions, such a restrictive view does not completely capture the reach and richness of the use of IT innovations (Tornatzky and Klein 1982). Thus, it is important to move forward to studying the extent of e-business adoption, rather than yes-or-no adoption decisions.

This study attempts to fill in these gaps. We seek to:

1. investigate the extent of organizational adoption of e-business;
2. study the relationships between e-business adoption and contextual factors; and
3. examine how these relationships vary across different economic environments (developed vs. developing countries).

The Internet is a technology with global reach; the WWW has no national boundaries. Yet, its adoption in organizations may be shaped by various local factors associated with the organization and its environment.

To understand these issues better, we conducted a large-scale survey in a developed country and a developing country. We choose the United States, the largest developed economy, as a representative of developed countries, and China, the largest developing economy, as a representative of developing countries. These two countries have obviously distinct contexts for e-business, including economic development levels, national environment, and IT infrastructure. Compared to the United States, China seems to lag behind in using information technologies, especially the Internet. However, China may catch up relatively quickly, since China has been able to take advantage of newer technologies. On the other hand, we expected that the lack of regulation support (e.g., supportive business laws and legal protection of Internet commerce) might retard e-business diffusion in China. Moreover, China is undergoing a transformation from a planned economy to a market-oriented economy, while the United States has relatively mature markets and a supportive institutional environment. These different economic and national environments may lead to different adoption patterns. These expectations sound theoretically plausible, but we wish to empirically test them by using survey data. The next section describes the theoretical background, followed by our research framework, the survey, and the results. The paper concludes with a discussion of the major results and implications.

THEORETICAL BACKGROUND

Although showing recent signs of advancement, the e-business adoption/diffusion literature still seems fragmented. A major reason is the lack of an overarching framework to unify various factors that may affect e-business adoption. In response to this problem, we reviewed the existing e-business literature, as well as prior studies of IT implementation and innovation diffusion. We found that the technology-organization-environment (TOE) framework developed by Tornatzky and Fleischer (1990) was comprehensive for identifying factors shaping innovation adoption, and could serve as a conceptual guideline for our research.

The TOE framework posits three aspects of an organization’s context that influence the process by which it adopts and implements a technological innovation: technological context, organizational context, and environmental context. Technological context describes both the internal and external technologies relevant to the firm. These include existing technologies inside the firm, as well as the pool of available technologies in the market. Organizational context is defined in terms of several descriptive measures: firm size and scope; the centralization, formalization, and complexity of its managerial structure; the quality of its human resources; and the amount of slack resources available internally. Environmental context is the arena in which a firm conducts its business — its industry, competitors, access to resources supplied by others, and dealings with government (Tornatzky and Fleischer 1990: 152–4).

The TOE framework has been examined by a number of empirical studies on various information systems (IS) innovations (for a literature review of empirical support for the TOE framework, see Zhu et al 2003). Following Tornatzky and Fleischer (1990), Iacovou et al (1995) developed a model formulating three aspects of EDI adoption — technological factors, organizational factors, and environmental factors — as the main drivers for EDI adoption, and examined the model using seven case studies. Their model was further tested by other researchers using larger samples (e.g., Kuan and Chau 2001). These studies demonstrated the usefulness of the TOE framework for identifying facilitators and inhibitors of e-business adoption. Since the TOE framework has a solid theoretical basis and consistent empirical support (e.g., Chau and Tam 1997; Iacovou et al 1995; Zhu et al 2003), we adopted it as our theoretical background. Yet, as a significant differentiation from prior research,
this study focuses on the extent of e-business adoption —
the degree to which organizations have migrated
various value-chain processes onto the Internet platform
(i.e., using Internet technology in combination with
existing information technologies) — rather than the
dichotomous adoption decisions.

Within the environmental context of the TOE
framework, we wanted to understand how national
environments might shape adoption patterns. A national
environment embeds many environmental factors
e.g., economic, legal, cultural, business and consumer
markets) that may influence IT diffusion. In the litera-
ture, several environmentally imposed obstacles that
managers face in implementing information technologies
in less developed countries were identified, including a
scarcity of managerial, technical, and financial resources
at the firm level (Dasgupta et al 1999); the inadequacy
of basic infrastructure at the national level (Dewan and
Kraemer 2000; UNCTAD 2002); and other institutional
factors such as culture and politics (Jarvenpaa and
Leidner 1998; Kshetri and Dholakia 2002). Yet, the
existing literature lacks reliable empirical evidence based
on large-scale surveys. Thus, we incorporated an inter-
national dimension into the environmental context of
the TOE framework, and sought to demonstrate varying
adoption patterns across developed and developing
countries, hence examining the role of local factors in the
adoption of a global technology.

RESEARCH FRAMEWORK

Drawing upon the technology-organization-environ-
ment framework, we developed a conceptual framework,
as shown in Figure 1, that incorporates six TOE factors
affecting the extent of e-business adoption: technology
competence; firm size; global scope; enterprise integra-
tion; competition intensity; and regulatory environment.
This framework is applied to both the United States and
China. Key elements of this framework are discussed below.

E-business adoption

As we pointed out earlier, it seems helpful to extend the
yes-or-no adoption decisions to the extent of e-business
adoption (Chin and Marcolin 2001; Tornatzky and
Klein 1982). We measure two aspects of the extent of
e-business adoption: breadth and depth. **Breadth** refers
to the reach of e-business along the value chain, i.e.,
whether the various value-chain activities (e.g., sales,
service, coordination, and procurement) have been
moved to the Internet. **Depth** refers to the percentage of a
single value-chain activity that has been migrated onto
the Internet platform. Together, breadth and depth
allow us to gain a deeper understanding of the extent of
e-business usage in organizations.

Technology competence

Drawing upon previous studies (Kwon and Zmud 1989),
we posit technology competence as an enabler or facili-
tator for e-business adoption. Technology competence
refers to the use of e-business-related technologies, such
as website, electronic data interchange (EDI), and elec-
tronic fund transfer (EFT). These technologies con-
stitute a platform on which e-business can be built; the
experience of using EDI may facilitate e-business

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**Data Diagram**

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<td>- Technology competence</td>
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<td>- Use of EB technologies (e.g., WWW, EDI, EFT)</td>
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**Figure 1. Research framework**
implementation. Therefore, firms with greater technology competence tend to enjoy greater readiness to adopt e-business (Zhu 2003). Compared to US firms, Chinese firms lack technological resources and prior experience with related technologies such as EDI (UNCTAD 2002). Thus, we expect that, at the current stage, acquiring e-business-related technologies would be a more critical determinant of e-business adoption in China than in the United States.

Firm size

Firm size, defined as the number of employees in the whole organization, is one of the most commonly studied factors in the innovation literature (see Damanpour 1992 for a meta-analysis). Yet, different opinions exist as to the role that firm size plays in the process of innovation adoption. On the one hand, large firms often possess more slack resources that can facilitate innovation adoption — the so-called resource advantages (Schumpeter 1950). On the other hand, large firms tend to be less agile than small firms. The greater structural inertia associated with large firms may entail more effort and costs for innovation implementation (Nohria and Gulati 1999). Thus, our study considers the influence of firm size on e-business adoption as a mix of resource advantages and structural inertia, but expects that resource advantages would be more significant for firms in China, as firms in developing countries often face a scarcity of managerial, technical, and financial resources (Dasgupta et al. 1999).

Global scope

The influence of global scope (i.e., global expansion) on e-business adoption also involves different opinions. First, firms with greater scope tend to have more incentives to adopt e-business, which could be explained from a transaction costs perspective. In general, companies face a steep rise in transaction costs when they expand into heterogeneous markets (Gurbaxani and Whang 1991). Since e-business may help reduce transaction costs including search costs, communication costs, contractual costs, and monitoring costs (Garicano and Kaplan 2001; Malone et al. 1987), firms with greater global scope may have stronger incentives to make use of e-business.

Second, complexity in implementing e-business may increase with global scope (Duncan 1976). That is, greater global scope incurs more effort, in the implementation process, for coordination among establishments scattered in different regions. In addition, firms operating in different countries face different cultural, regulatory and national environments, a barrier for forming an integrated e-business system working across country boundaries. We expect that this issue is more pronounced for Chinese firms, since China, to some extent, has a different economic and regulatory environment than most Western countries, which may increase costs for Chinese firms to achieve higher levels of e-business adoption in establishments in China and abroad.

Enterprise integration

It is difficult for innovators to pursue sustained business value by investing in information technologies per se, as competitors may appropriate value by imitation (Barney 1991). As a result, technologies may become necessities, rather than value creators (Clemons and Row 1991). E-business adopters should pay particular attention to this issue, as many e-business activities are visible on the Internet and the wide connectivity of the Internet itself accelerates information and resource mobility. Thus, e-business adopters need to commit to ‘deep usage’ of the Internet technologies (Chin and Marcolin 2001).

A key strategy of ‘deep usage’ is to integrate separate databases and heterogeneous information systems to improve responsiveness and reduce incompatibility among IS applications (Zhu and Kraemer 2002). This can help unleash the hidden value of complementary resources (Zhu 2003). Although the individual components that go into the e-business platform are commodity-like, the process of integrating the components to develop a coherent e-business system tailored to a firm’s strategic context is complex and imperfectly understood (Zhu and Kraemer 2002). Thus, enterprise integration — defined as the extent to which separate databases and technologies are connected within and beyond firm boundaries — can hardly be imitated by competitors and thereby has the potential to create significant e-business value, thus driving continued usage of e-business in organizations (Zhu, 2003). Thus, we hypothesize a positive association between enterprise integration and the extent of e-business adoption.

Competition intensity

Competition intensity refers to the degree that the company is affected by competitors. Porter and Millar (1985) analysed the strategic rationale underlying the relationship between competition intensity and IS innovations. They suggested that, by adopting IS, firms might be able to alter the relative positions of competition, affect the industry structure, and leverage new ways to outperform rivals, thus changing the competitive landscape (Zhu 2002). Therefore, firms facing a greater degree of competition intensity may face more pressure to adopt, and tend to achieve higher levels of adoption. We apply this argument to the Internet domain, and expect a positive
Our final dataset contains 175 Chinese firms and 262 US firms. Distribution of firm size measured by employee number reflects a balance of large and small businesses. Most respondents are CIOs, CEOs and IS managers or directors, which suggests a good quality data source. We also examined non-response bias and no statistically significant differences were found in terms of revenue and firm size.

Then, using the survey data, we conducted a two-step analysis. First, to understand the status of e-business diffusion and the nature of e-business contexts in the United States and in China, we compared key variables in our research framework in the two countries (called the ‘US–China comparison’ in the rest of this paper). Second, we utilized structural equation modelling (SEM) to test relationships between e-business adoption and contextual factors. SEM serves as a complementary test for the robustness of the results obtained at the first step, while findings from the US–China comparison help to explain SEM results. Thus, combined together, the cross-sample comparisons and SEM enable us to cross check our conclusions about the relationships among economic environment, e-business contexts, and organizational adoption.

**SURVEY RESULTS: THE US–CHINA COMPARISON**

As shown in the research framework in Figure 1, our survey investigated the extent of organizational adoption of e-business and influential factors within the technology-organization-environment contexts. We list summary statistics of these variables in Tables 1 to 5. To gain a better understanding of these items, we compared their mean values across the two samples. For these comparisons, ANOVA (t-statistic reported), $\chi^2$ test, or...
Mann-Whitney U-test (Z-score reported) was used with appropriate consideration about the nature of the data (Johnson and Wichern 1992; Morrison 1990). The null hypothesis of each comparison is that the variable of interest has the same mean in the two samples. Accordingly, a significant test statistic leads to a rejection of the equal-mean hypothesis.

In Table 1, we compare firms in the two countries with respect to their use of e-business-related technologies and IT professionals as a percentage of total employees. As predicted earlier, Chinese firms lag behind in using e-business-related technologies (e.g., website, EDI and EFT), as indicated by the significant $\chi^2$ statistic. The gap between Chinese firms and US firms is particularly noticeable for traditional technologies connecting companies with their suppliers and business partners, e.g., EDI and EFT. With regard to IT human resources, there is a significant imbalance between large firms and small...
firms in China: Small firms have a much higher percentage of IT professionals in their workforce. One plausible explanation is that, while many small businesses are privately owned, most large firms in China are state-owned and have operated for several decades in a planned economy, in which the need for processing market information was limited. As a result, these firms in general are characterized by low information intensity and tend to hire fewer IT professionals.

Table 2 shows the global scope of US and Chinese firms. It is surprising to find that Chinese firms are more global than US firms, in the sense that more Chinese firms have establishments abroad and headquarters abroad ($\chi^2$ significant), and that international trade (including both sales and purchases) accounts for a greater portion of total trade for Chinese firms than US firms (t-stat significant). Such differences may reflect the rapid globalization of the Chinese economy, partly driven by China's entry into the WTO and position as a production platform for foreign multinational corporations. However, recall that Chinese firms in our sample are located in the coastal area (more advanced) and represent advanced firms rather than average firms in China (see note 1). We thus need to be cautious when attempting to generalize this result. As hypothesized earlier, greater global scope may have mixed influence on the extent of e-business adoption, which will be formally tested later using structural equation modelling. We also compared firm size. It is not surprising that US firms on average have significantly greater annual revenue (t-statistic significant), although firms in these two countries do not differ significantly in terms of number of employees.

With respect to enterprise integration (Table 3), firms in these two countries do not appear to differ significantly (Z-score insignificant). It is possible that hidden differences or relationships exist but may require more sophisticated methods to discover. Hence, we will further explore relationships among technology competence, enterprise integration and e-business usage later using structural equation modelling.

Table 4 contains comparisons of the two countries' environments in which firms conduct e-business. US firms generally perceive greater rivalry from domestic markets, while Chinese firms are more likely to be affected by international competitors (Z-score significant). This may result from the fact that Chinese firms in the coastal area have frequent interactions with international competitors, given that a higher percentage of their sales and procurement is international. Another plausible explanation is that China's entry into the WTO has caused the Chinese government and businesses to regard international competition as more significant.

In terms of the regulatory environment, significant Mann-Whitney tests demonstrate that, at the current stage, government regulation plays a far more critical role in e-business diffusion in China than in the United States. The greater influence of government requirements (use of e-business for government procurement) and government-provided incentives seem to reflect more frequent government interventions in China. In addition, the greater need for business laws and legal protection for online purchases seems to imply that Chinese firms are in urgent need of supportive legal and institutional environments to facilitate e-business growth, which are currently lacking.

Finally, we compare organizational usage of e-business in the two countries in Table 5. It is clear that, compared to US firms, fewer Chinese firms use the Internet for selling, purchasing, serving customers and exchanging data with business partners (see the first half of Table 5). However, the second half of the table demonstrates an interesting pattern. On average, firms in the United States and China do not differ significantly in terms of percentages of sales and services conducted online (t-stat insignificant). This seems to suggest that advanced Chinese firms are performing e-business proactively, and Chinese firms may be able to catch up relatively quickly by taking advantage of newer technologies.

Yet, in one area, Chinese firms lag significantly behind the United States, namely online procurement. US firms purchase on average 20.27% of total business supplies and 11.49% of total goods for production on the Internet, while the figures are only 1.54% and 2.28% for Chinese firms. This finding is consistent with the gap shown in Table 1, that Chinese firms fall behind in using interorganizational technologies such as EDI and EFT. This finding also shows that the success of interorganizational systems depends heavily on coordination among business partners and is contingent on the extent of innovation diffusion in the whole value chain, which goes beyond individual companies (Teo et al 2003). Thus, it is more difficult for China to catch up in the B-to-B area than in the B-to-C area. China's B-to-B e-business may not take off until China reaches a critical mass when e-business adoption becomes broad across the value chains.

In summary, cross-sample comparisons between US firms and Chinese firms in the coastal areas shown in Tables 1 to 5 demonstrate the following key differences with respect to organizational adoption of e-business and influential factors:

- Chinese firms lag in using e-business-related technologies, especially interorganizational technologies such as EDI and EFT.
- Government plays a far more critical role in China than in the United States, perhaps due to the fact that China lacks a legal and institutional environment to support e-business.
- Fewer Chinese firms are using the Internet for selling, offering services, purchasing and exchanging data with business partners, compared with US firms.
- Chinese firms may be able to catch up by taking advantage of newer technologies. Our survey seems to
suggest that advanced Chinese firms are performing e-business proactively. Yet, Chinese firms significantly fall behind in B-to-B online procurement, partly due to the imbalance of e-business diffusion in China.

• Chinese firms on average have greater global scope and tend to perceive greater pressure from international competitors than US firms.

These results help us to understand the differences and similarities of e-business adoption in the United States and China, yet finer-grained relationships may exist. We will further test the robustness of some of these findings by using structural equation modelling. As a more rigorous method, SEM may offer a more holistic picture of e-business adoption, as relationships between all TOE factors and e-business adoption can be examined simultaneously in one unified model.

FURTHER TEST: STRUCTURAL EQUATION MODELLING

Structural equation modelling was conducted as follows: First, we formed reflective constructs of the extent of EB adoption and the six TOE factors using indicators shown in Tables 1 to 5. We also included an intermediate construct — incentive to adopt EB, which was hypothesized to be affected by the TOE factors, and then determined the extent of EB adoption. Instrument validation was performed by confirmatory factor analysis, as implemented in AMOS 4.0, a covariance-based SEM software package. All constructs passed the tests for construct reliability, convergent validity and discriminant validity, and thus they could be used for testing relationships specified in the structural model (Straub 1989).

Then, we estimated the structural model shown in Figure 2 using the full sample (the US and China), and evaluated the structural model in terms of normed $\chi^2$ ($<3$, Anderson 1987), incremental fit indices ($>0.9$, Hair et al 1998), RMSEA ($<0.08$, Browne and Cudeck 1993), and statistical power ($>0.8$, Baroudi and Orlikowski 1989). Our structural model satisfied all these criteria, indicating a good model fit with the empirical data and sufficient statistical power. Finally, we fitted the structural model on the US sample and on the China sample separately. Again, all fit indices were satisfied. The estimation results of the full sample and the two subsamples are shown in Figure 2.

A positive and significant path associated with a contextual factor suggests the role of an adoption facilitator; while a negative and significant path suggests an inhibitor. Thus, the full sample result demonstrates four adoption facilitators — technology competence, enterprise integration, competition intensity, and regulatory environment. Results of the US sample and the China
sample demonstrate different roles of five factors across the two countries, as suggested by differences in path estimates: firm size and enterprise integration have different significance levels, global scope has a different path sign, and technology competence and regulatory environment have clearly different path magnitudes. Some of our earlier results from the cross-country comparison are confirmed by SEM, such as the more critical role of government regulation in China. SEM also offered several new findings that the cross-sample comparison did not reveal. New findings include the different roles played by firm size, global scope, and enterprise integration across the two samples, which will be discussed soon. These empirical results, combined with good model fit, strong statistical power, and sufficient data variance explained, indicate that the TOE research framework in Figure 1 is appropriate for explaining factors shaping e-business adoption. Yet, reflected by the R² in Figure 2, this framework seems to work better for the US sample than the China sample, suggesting that some additional factors might be at work in the China sample.

**DISCUSSIONS AND IMPLICATIONS**

Drawing upon the results of the structural equation modelling and the US–China comparison, we summarized four major empirical results. We discuss them in this section and offer explanations and implications.

1. **While technologies are more critical for Chinese firms, enterprise integration becomes far more important in the United States.** This seems to suggest that, as firms move into deeper stages of e-business transformation, the key determinant shifts from technology infrastructure to organizational capabilities.

   The empirical results demonstrate the differing significance of technology competence and enterprise integration for the two countries. E-business-related technologies exhibit greater impacts on e-business adoption in China (SEM path 0.52*** than in the United States (SEM path 0.31***). This is consistent with our earlier finding shown in Table 1 that Chinese firms face a scarcity of technology resources. Enterprise integration is significant in the United States (SEM path 0.29*** but is insignificant in China. Developed countries and developing countries are at different stages of e-business development (UNCTAD 2002). The difference across the two samples seems to suggest that, as e-business evolves, the key determinant of its usage shifts from technology infrastructure to organizational capabilities, especially enterprise integration that helps to leverage existing information systems and databases, thus creating resource complementarities (Zhu and Kraemer 2002).

2. **The effect of firm size is a mix of resource advantages and structural inertia.** In the United States, structural inertia associated with large firms tends to retard e-business migration; while in China, resource advantages seem to moderate the negative effect of structural inertia.

   In the United States, firm size has been shown to retard e-business adoption (SEM path −0.10*), reflecting the negative effect of structural inertia associated with large firms (Nohria and Gulati 1996). This negative effect of structural inertia, in contrast, seems to be neutralized by the resource advantages associated with large firms in China. Large firms tend to enjoy a more pronounced advantage than small firms in developing countries where the playing field seems to be less even than in developed countries (UNCTAD 2002). Drawing upon our earlier argument that the influence of firm size is a mix of resource advantages and structural inertia, this result implies that in developing countries, resource advantages (e.g., large firms tend to have more slack resources) tend to be offset by the negative role of structural inertia. On balance, these two effects seem to cancel each other out; hence we see the insignificant path from firm size to e-business adoption in China.

3. **Global scope also shows a mixed effect.** In the United States, greater scope is an adoption facilitator due to the greater potential benefits offered by e-business, while in China, increased complexity associated with greater scope tends to inhibit e-business adoption.

   Chinese firms seem to have greater global scope (Table 2), yet suffer from the increased complexity of globalization with respect to using e-business (SEM path −0.20*). One plausible explanation is that China has a very different economic and regulatory environment than most Western countries. These gaps may induce higher costs to build an integrated e-business system across country boundaries. As a comparison, the United States has a relatively compatible economic environment with most Western countries. US firms have less difficulty handling the increased implementation complexity associated with global expansion. Thus, for US firms, the main effect of greater scope is the increased potential benefits offered by e-business, which drives organizational adoption of e-business (SEM path 0.16*).

4. **Government regulation plays a more critical role in China than in the United States.**

   The regulatory environment is more important for Chinese firms (0.32*** than for US firms (0.19**), which is consistent with our earlier finding shown in Table 4. It is possible that this could be the case in other developing countries as well. In most developing countries, markets are characterized by information asymmetry 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.
In summary, using a large-scale, cross-country survey, we have demonstrated the usefulness of our research framework that incorporates technological, organizational and environmental factors. This framework might be useful for other researchers to study various information system adoptions in different settings, such as wireless mobile commerce. Using a two-step analysis involving two mutually reinforcing and complementary methods, we have shown different e-business adoption patterns across developed and developing countries, and identified a series of influential factors that may play different roles in different economic environments. This suggests that e-business is spreading globally, but different economic and national environments affect organizational adoption. All of the relationships arising from our data analysis could help other researchers to build their research models.

These results have several important implications for managers and policy makers. First, our results suggest that managers should assess the technological conditions under which e-business is used. More importantly, as e-business evolves, managers need to shift the focus from technology investment per se to capabilities of integrating various technical components into a streamlined system. As Internet technologies diffuse and become necessities, these organizational capabilities become even more critical.

Second, managers need to assess the appropriateness of e-business to certain organizational characteristics (e.g., firm size and global scope). That is, these structural variables may affect the potential benefits of e-business and influence the readiness and complexity of e-business adoption. Moreover, their influences may vary in different economic environments. Thus, managers need to adjust their assessments as the economic environment evolves.

Third, environmental factors (e.g., competition intensity and government regulation) have emerged as important factors shaping e-business adoption. The regulatory environment is even more important in developing countries. Companies frequently cite significant obstacles of doing e-business, including inadequate legal protection for online business activities, unclear business laws, and security concerns. This points to the need for establishing a legal and institutional framework supporting e-business and online transactions. Governments, therefore, could accelerate e-business transformation by establishing supportive business and tax laws to make the Internet a trustworthy business platform. This is particularly important in the early stages of e-business development in an economy.

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Notes

1. The Chinese companies were selected from a random sample of firms from four cities — Beijing, Shanghai, Guangzhou and Chengdu. Most of them are in the coastal area (except for Chengdu) which is more advanced in economic development, ties with the global economy, and the use of IT. Hence, our China sample represents the more advanced companies, rather than average companies in China.
2. After we received the dataset, which contained 204 Chinese responses and 300 US responses, we checked for consistency and excluded 69 outliers based on sales, employee number and financial resources.
3. Different types of data require different methods. For continuous data, such as the 2001 revenue in Table 2 and the mean percentage of business conducted online in Table 5, ANOVA was used; for discrete data of ranking (i.e., 5-point Likert scale), Mann-Whitney U-test was used; and for binary data, \( \chi^2 \) test was used (Johnson and Wichern 1992; Morrison 1990).
4. This construct is measured by responses to the survey items — ‘the extent to which your firm expected e-business to help to reduce costs, expand markets for existing products, enter new businesses, and improve coordination with business partners’ (5-point Likert scale).

References


