

# Study on E-Commerce Adoption in SMEs Under the Institutional Perspective: The Case of Saudi Arabia

Almaaf Bader Ali A, Nanjing University of Aeronautics and Astronautics, Nanjing, China

Jian-Jun Miao, Nanjing University of Aeronautics and Astronautics, Nanjing, China

Quang Dung Tran, National University of Civil Engineering, Hanoi, Vietnam

## ABSTRACT

This article investigates and discusses the institutional factors influencing decisions of e-commerce adoption in Saudi small and medium enterprises (SMEs) from the temporal view. This article has been conducted in two phases: a full survey in 2013 and the follow-up targeted interviews in 2016. The analysis results demonstrated that there is a clear difference between initial e-commerce adoption and institutionalization in SMEs in terms of institutional predictors. When e-commerce was at its infant stage, governmental support and well-defined legal and regulations system were instrumental and served as mainly institutional forces to encourage firms to adopt e-commerce. As time went on and e-commerce became more business-driven, these effects become less important, even insignificant; instead of these, perceived market forces and perceived social awareness of e-commerce emerges as critical contributions to push SMEs to engage in e-commerce more sophisticatedly.

## KEYWORDS

Adoption, B2B E-Commerce, Institutional Factors, Saudi Arabia, SMEs

## INTRODUCTION

The literature on e-commerce empirically reveals that e-commerce adoption brings potentially benefits to SMEs (Tran et al., 2013). E-commerce in general bridges the physical and time-dependent distance between suppliers and customers, enhances the efficiency and flexibility of production and operation, reduces market entry barriers, and increases the competitiveness of markets. However, its adoption by SMEs remains limited. For example, a previous survey found that 36% of small businesses established web sites primarily to advertise and promote their business, compared to 9% who established one to sell or market online. Similarly, a survey of 444 SMEs found that many SMEs were reluctant to conduct transactions on line; more than 80% were only using the Internet to communicate (via e-mail) and gather business information (Zhu, 2008). Al-Qirim (2008) found that the main barriers or concerns inhibiting SMEs from adopting e-commerce are: non-adopted customers/suppliers, violated privacy and security issues, lack of expertise or personnel, lack of belief that online marketing would be effective, high costs, and technical limitations of hardware or software.

Although the King of Saudi Arabia (KSA) has the largest and fastest growth of Information Communication Technology (ICT) marketplaces in the Arab region, the diffusion and the rate of B2B e-commerce sophistication in SMEs are actually very low, and not parallel with the remarkable development of the e-business infrastructure (AlGhamdi et al., 2012). The challenge for policy-makers

DOI: 10.4018/IJEA.2018010104

This article published as an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>) which permits unrestricted use, distribution, and production in any medium, provided the author of the original work and original publication source are properly credited.

is therefore to better understand the e-commerce phenomenon and to ensure that the opportunity and potential offered by e-commerce is taken and realized in SMEs. There has been a long-standing debate and different approaches on how an enabling environment should be created and shaped to foster e-commerce adoption and diffusion. Additionally, the existing literature is lacking studies to focus on investigation of various determinants of decisions of e-commerce adoption at the different levels. Tran et al. (2014) and Molla & Licker (2005) provided empirical evidence showing that the determinants of initial adoption of e-commerce are very different from those of institutionalization of the technology. The experience of the initial adoption of e-commerce is also found not to have any significant effect on the decision of subsequent implementation of the technology.

Therefore, the purpose of the study is to investigate institutional factors affecting decisions of e-commerce adoption in Saudi SMEs from the temporal view. To address this objective, a conceptual model was developed based on the institutional perspective. This study has been conducted in Saudi Arabia in two phases. Phase I was in 2013 with a full survey and phase II was in 2016 with the follow-up targeted interviews. Data collected was analyzed to investigate whether determinants of e-commerce adoption in SEMs are different at maturity levels and change over time.

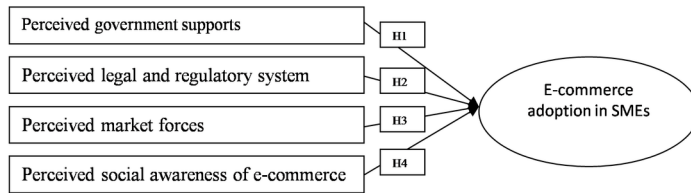
## **THE THEORETICAL BACKGROUND**

The conceptual research framework was developed based on the institutional theory (Figure 1). The institutional theory provides a rich, complex view of organizations; organizations are open systems and the institutional context is a major source of influence on organizational behavior. Accordingly, in order to understand individual and organizational behavior, it must be located in a social and institutional context, and this context both regularizes behaviors and provides opportunity for agency and change. Institutional theory posits that pressures from industrial, political, legal and cultural systems, and expectations from society define what is socially acceptable and expected organizational behavior, which pressures organizations to look and act the same. In viewing institutions more widely as varied social constructs, including cultural beliefs, new institutionalism has moved away from its formal legal historical roots and become a more explanatory discipline in economics and social sciences. Contemporary institutional theory focuses on developing a sociological view of institutions -the way they interact and the way they affect society (Scott, 2005).

There is substantial evidence in economics that firms in different institutional environments react differently to similar challenges and that companies can perform efficiently if they receive the institutional support (Gosain, 2004). The limited studies of IT adoption and diffusion in the last decade have also suggested that a supportive institutional environment and a variety of nurturing policies from governments are especially indispensable for technological innovation. Therefore, this study considered five independent institutional constructs: perceived government supports, perceived legal and regulatory system, perceived market forces, and perceived social awareness of e-commerce.

The dependent variables, e-commerce initial adoption, and intention for e-commerce institutionalization are posited as the primary constructs of SMEs' adoption of e-commerce at different levels. Based on the literature, the level of e-commerce adoption should be considered through the sophistication in terms of management, function, technology, and information, and the usage degree of e-commerce innovation by enterprises. In other words, the level of e-commerce adoption is a product of sophistication level by usage degree. Since the first stages of e-commerce adoption process is very simple while its last stages are much more sophisticated and complicated in terms of technology and management, consequently, the first stages are also very different from the last stages in terms of demand of technology infrastructure, management, and other resources. In order to effectively implement e-commerce at the more sophisticated level, one certain enterprise needs to reach a much higher e-readiness in terms of both external and internal environments. In this study, instead of studying the process of e-commerce adoption on many different stages, it investigated determinants of e-commerce adoption at two key levels, namely initial adoption versus institutionalization.

Figure 1. Research framework and hypotheses



Initial adoption is referred as the simple level of e-commerce adoption with the low sophistication level and the low degree of usage. One enterprise is considered as in the initial adoption level if it has been implementing only one or several simple e-commerce innovations separately for a small part of the total business transactions and has been using only the static or interactive websites to make promotions and publish basic company information or receive queries, e-mail, and form entry from users (Molla & Licker, 2005; Tran et al., 2014).

Institutionalization is referred as the most sophisticated adoption of e-commerce. One enterprise is considered to be in the institutionalization stage if it has an integrated e-commerce system with external business partners and existing organizational systems, and most business processes conducted electronically. It means that the enterprise has implemented many different e-commerce innovations, most its B2B business processes have been conducting electronically, e-commerce innovations implemented having a good interoperability together, and with other existing IT systems, and e-commerce innovations implemented have a good interoperability with external IT infrastructure through transactive or integrated websites, and e-marketplace. Especially, based on the literature on Information Systems alignment, institutionalization of e-commerce should also be reflected through the degree of consistency between e-commerce strategy with business strategy, organizational structure, and social environment within the enterprise (Chiang & Nunez, 2013).

## DEVELOPMENT OF HYPOTHESES AND CONSTRUCTS

### Perceived Government Supports

Government support takes various forms from country to country; however, the institution theory indicated that governments played a critical role in creating the institutional environment that fostered private investment and e-commerce in particular (Oxley & Yeung, 2001). For e-commerce to succeed, the economy needs to be competitiveness, transparency, stableness; trend of collaboration and cooperation.

#### *Policies and Commitments for National E-Commerce*

Al-Rawi et al. (2008) reviewed and explored e-commerce growth in the Gulf region and they found that the governments' roles in promoting e-commerce is essential in terms of ensuring coherent policy for IT and e-commerce regarding consumer protection; secure, transparent, predictable, and enabled environment; coordination, collaboration, and cooperation. The European Commission's report suggested that governmental policies aiming at promoting e-commerce should include creating incentives and a favorable environment for enterprises; supporting educational and training programs; and establishing the role model of the public sector. It is argued that national policies for e-commerce, such as trade and telecommunication liberalization, training and maintaining an adequate e-commerce workforce, were likely to have a big impact on e-commerce by making IT more affordable to firms (AlGhamdi et al., 2012). Government's role in supporting e-commerce adoption in the private sector has been referred to as a leader, promoter, facilitator, regulator, educator and financiers.

### *E-Government Initiatives*

In less developed or developing countries, competitive environment is often determined by the relationship between businesses and government, and business managers in SMEs often trend to be directed by government and less willing to accept changes (Huang et al., 2014). Once e-government initiatives are implemented, government's role often changes from simply informational to transactional. As a result, the government becomes both supplier and consumer therefore contributing to the growth of e-commerce (Huang et al., 2014).

In Australia, the Government is providing support in various forms; for example, hosting an online retail forum to encourage, assist and inform retailers. The Hong Kong ordinance contributed to future growth in e-commerce by providing for a legal infrastructure, such as the use digital signatures. It is stated that the Brazilian e-government initiatives, such as e-services and e-procurement have strongly stimulated e-commerce activities in the private sector. In many other countries, such as Denmark, France, the effectiveness of government supports in building consumer acceptance of IT as well as developing IT literacy to promote IT and e-commerce in businesses, especially SMEs was recorded (Gibbs & Kraemer, 2004).

Regarding SMEs, Lip-Sam & Hock-Eam (2011) and Jeon et al. (2006) found empirically that government support was effective factor for e-commerce adoption at all adoption levels in SMEs. When asked to identify the measures to encourage wider adoption and use of ecommerce, SMEs in the APEC region highly ranked government actions in improving telecom infrastructure, imposing fair tax policy for online transactions, developing national e-commerce strategy, enhancing government e-commerce use, providing e-commerce training, and promoting e-commerce use.

However, there were some contradictory findings in previous literatures with respect to governmental support. Ifinedo (2011) found that government support were not significant for the e-commerce adoption of SMEs in Canada. Governmental support was also not regarded as a driving factor for e-commerce adoption in USA (Chong et al., 2009). It was also found insignificant in differing groups of firms between Internet adopters and non-adopters in Singapore (Teo et al., 2009), in affecting the success level of e-commerce among SMEs in IT industry of Taiwan (Huang, 2009), and in the probability of e-commerce adoption of SMEs in Brunei (AlGhamdi et al., 2012). Therefore, we propose:

**Hypothesis 1:** Government support contributes significantly (and is positively related) to (a) initial adoption of e-commerce and (b) institutionalization in SMEs.

### **Perceived Legal and Regulations System**

The legal consideration was the root of traditional institutional theory. Institutions were first the legal ground rules and procedures. Institutional influences were therefore political in nature as when organizations must conform to laws and regulations to earn the organizational legitimacy (Yuan et al., 2012). A well-defined legal framework is positively related to ensuring the security of e-commerce activities, and improves trust in e-transactions (Kim, 2005). The lack of legal framework for e-commerce in a country causes consumers to have significant reservations on purchasing online (Gibbs & Kraemer, 2004). The consumers' concerns regarding trust in business practices, privacy/security, and "resistance to using credit cards, and preferences for in-store shopping and inspection of products" become greater in an environment where the legal framework is less established (Gibbs & Kraemer, 2004).

Several international studies using secondary data found that the legal environment in a country significantly affected e-commerce activities and revenues in that country (Oxley & Yeung, 2001). A group of firm-level survey studies also showed that the regulatory environment was significantly important to determine both the breadth and depth of e-business adoption and drive the e-business value, especially in developing countries and newly industrialized economies (Gibbs & Kraemer,

2004). Another study of more than 100 SMEs in the state of Kentucky showed that regulations and rules were an important factor for e-commerce adoption (Kim, 2005). In addition, the implementation of e-commerce systems at the more sophisticated level demands even a more well-defined legal and regulatory system. Therefore, we propose:

**Hypotheses 2:** Legal and regulations system have significant effects on (a) initial adoption and (b) institutionalization of e-commerce in SMEs.

### **Perceived Market Forces**

E-commerce activities respond to the network principles in the social-business system of the enterprise (Molla & Licker, 2005). In other words, firms' potential for e-commerce is a function of their operating environment, including economic, social, and political factors. Organizations that perceive institutional pressures as ready for e-commerce are likely to adopt e-commerce or implement e-commerce at the more sophisticated level (Rogers, 1995). The level of take-up by suppliers and customers may have a corresponding effect on a firm's commitment to e-commerce. However, it is argued that such pressures tend to be less likely for some businesses in developing or less developed countries' context. For SMEs in relationships with large firms, the motivation to adopt is fueled by the integration of trading partners into organizational extranets (Zhu & Kraemer, 2005). Large companies are increasingly outsourcing many of their requirements, and e-enabled SMEs have the ability to respond more quickly to changing demands than their large counterparts enabling them to take advantage of outsourcing opportunities (Featherman & Pavlou, 2003).

A recent comprehensive study on SMEs in Denmark, Germany, France and the U.S. found that important drivers for e-commerce diffusion in manufacturing, retail/wholesale and financial service sectors included the use of e-commerce by major competitors, customer demand, and supplier requirements. The European Commission's e-Business Survey 2006 found that four main reasons for companies to start e-commerce were: "because competitors use it," "to gain competitive advantage," "to fulfill customers' expectations," and "to fulfill suppliers' expectations," which in summary represented competition pressure and market demand (Batenburg, 2007). Furthermore, policy-makers, industry practitioners and academic researchers, especially those in the U.S., strongly believed that while the government had an important role to play in setting the proper business climate to promote innovation, e-commerce development should be guided principally by market competition, market choice and industry leadership (Zhu & Kraemer, 2005). Several key dimensions of the market force identified in the literature review are discussed including (1) Competitive pressure, (2) Pressure/encouragement from customer/supplier, (3) Pressure/encouragement from trend-setting firms; and (4) Pressure/encouragement from industry/trade associations.

#### *Competitive Pressure*

Competitive pressure refers to the situations of marketplace where there are firms running similar businesses in competition with each other. In relation to e-commerce, this refers to the situation where selling online successfully and profitably can affect market share in the traditional marketplace (To & Ngai, 2006).

Pressure exerted by competitors' use of e-commerce was empirically a main driver of e-commerce adoption decisions among firms in Hong Kong (Gunasekaran & Ngai, 2008). When surveying more than 270 companies across three industries in ten countries, Gibbs et al. found the pressure from competitors was a significant determinant of scope of e-commerce use (Gibbs & Kraemer, 2004). Pressures from an enterprise's external business environment (suppliers, clients, competitors, and partners) were found as the most significant factor affecting the level of institutionalization of e-commerce adoption in developing countries (Molla & Licker, 2005).

The findings about competitive pressure in the literature review, however, were not always consistent. The importance of competition was only marginal in e-commerce adoption among large public firms in India (Tarafdar & Vaidya, 2006). In a cross-country survey of retail industry, Zhu et al. found that competitive pressure was a significant factor for use of e-commerce only in developed countries, but not in developing countries (Zhu & Kraemer, 2005). Lastly, competition was not so important to the e-commerce starters and late adopters as to those extended adopters in New Zealand (Al-Qirim, 2008).

In Saudi Arabia, the reviewed literature does not record competition as an influencing factor in the adoption of e-commerce. Because of the lack of maturity of online business environments in the country, the convenience of traditional shops nearby and there is no competitive pressure on the Internet (AlGhamdi et al., 2012).

### *Pressure/Encouragement From Customers/Suppliers*

Trading partners could be a dominant customer (or supplier) pushing its suppliers (or customers) to implement relationship-specific information systems. Several empirical studies have proved a positive relationship between trading partner's pressure and e-commerce adoption among SMEs in Singapore, and South Korea (Teo et al., 2003). Both traditional and IT manufacturers in SMEs in Hong Kong claimed that customer pressure was the primary motivator for them to adopt e-commerce (Ghobakhloo et al., 2011). Furthermore, SMEs participated in an APEC's e-commerce survey ranked "low use of e-commerce by customers and suppliers" as the No.1 perceived barrier to e-commerce adoption (Luqman & Abdullah, 2011). On the other side, although it was most important for the diversity of e-commerce usage, pressure from trading partners was not significantly important for e-commerce transaction volume in US companies (Kiong, 2004). Moreover, Chan et al. surveyed 627 SMEs in manufacturing and trading industries in Hong Kong and found 74 trading partners' influence to be totally opposite: compared with non-adopters, those EDI adopters considered the request by trading partners significantly less important (Chan et al., 2012).

### *Pressure/Encouragement From Industry/Trade Associations*

Industry or trade associations have been strong promoters of B2B e-commerce, especially to SMEs, by providing them technical support, training and funding (Gibbs & Kraemer, 2004). For example, based on 50 qualitative interviews in multiple countries, it is found that trade and industry associations played an important role in promoting e-commerce in southeastern Europe (To & Ngai, 2006). Those associations also involved actively in setting up the industrial e-commerce standards. Their level of involvement and their actions were critical in launching an industry-wide use of IT. A contradictory finding in a survey of 137 CEOs showed no significant effect of trade association on e-commerce adoption in Taiwan's travel service industry (Wang et al., 2010). Drawing on the theoretical and empirical arguments, this study hypothesized that institutional pressures (from competitors, customers/suppliers, and industry associations) had a positive influence on a firm's e-commerce adoption, as follows:

**Hypothesis 3:** Perceived market force has significant effects on (a) initial adoption and (b) institutionalization of e-commerce in SMEs.

### **Perceived Social Awareness of E-Commerce**

The socio-culture environment should be of positive trust, beliefs, concepts, judgments, expectations, and methodologies towards e-commerce (Huang et al., 2014). Information sharing among organizations and between businesses with government is indispensable. All players need to have a positive perception of the role of information and positive attitudes toward IT and e-commerce. An information-sharing incentive industrial culture is more important for the development of e-commerce in developing

or less developed countries. Social awareness of e-commerce represents social culture, knowledge, and attitudes of the industry toward e-commerce. It includes four facets: (1) industrial economic characteristics (i.e., competitiveness, transparency, stability, trend of collaboration, and cooperation), (2) industrial socio-culture characteristics (i.e., trust, beliefs, concepts, judgments, expectations, and methodologies toward e-commerce) that are shared by people and enterprises within the industry, (3) industrial knowledge characteristics (i.e., perceptions of IT, skilled labor force, technicians, IT-oriented managers) required for the development of e-commerce strategy, and (4) industrial knowledge sharing infrastructure (i.e., initiatives available to share and develop knowledge and positive culture toward e-commerce (Ismail & Kamat, 2008; Zhu et al., 2006). E-commerce will benefit from online business educational programs and building the electronic services awareness in a country. Huang et al. (2014) found that government could mostly influence e-commerce diffusion through knowledge development including training programs, subsidies, and educational and informational campaigns to build the e-commerce awareness on nationwide. Therefore:

**Hypotheses 4:** Perceived social awareness of e-commerce significantly influences (a) initial adoption and (b) institutionalization of e-commerce in SMEs.

## RESEARCH METHODOLOGY

This study used the explanatory mixed research method including first collecting quantitative data and then collecting qualitative data to help explain or elaborate on the quantitative results.

### Data Sampling Procedures

#### *Data Collection for the 2013 Quantitative Study*

Data was collected in the Kingdom of Saudi Arabia (KSA) using a mixed sampling procedure. Based on previous experience through the pilot study; it is highly difficult and takes long time to reach top managers in the Saudi enterprises using the common communications (e.g. email, letter, and calls without recommendation). In fact, the researcher has tried to find help from several government officials but failed as they were not helpful. It is often that surveys via self-administered questionnaire through post or e-mail in the KSA gain a very low response rate; we used questionnaire survey administered in person in this study. The pilot study also confirmed that the questionnaire in person is appropriate for this situation.

Data collection was performed via a multistep process. Firstly, the website at [http://www.saudiapp.com/category/Small\\_business](http://www.saudiapp.com/category/Small_business) accessed on 20 June 2013 which lists all 6909 small and medium enterprises in KSA, was used as an initial contact source. Next, researchers grouped all SMEs who have their own websites listed in this page to make a new list of 762 SMEs that is considered as a sampling frame for this present study. At this point, the researchers used parallel two methods. On one hand, based on the random systemic sampling technique (every 5 items) we have collected 70 small and medium enterprises, and then an interview invitation email and the questionnaire were electronically sent out to them by the researchers to introduce the research project. Only 14 out of these seventy enterprises agreed to participate in the project.

On the other hand, the researchers used the help of twelve professors from the King of Saudi University – College of Business Administration in Riyadh, the Kingdom of Saudi Arabia to reach enterprises. They provided a list of 62 managers from enterprises but only 32 managers from appropriate enterprises who belong to the population (i.e. small and medium firms having their own websites). Then, calls or emails were sent out to introduce the research project and ask interviews. There have been 25 out of the 32 managers agreed to participate in the project. In next step, the researchers made calls directly to the 39 firms (i.e. 14 ones from the first technique and 25 ones from the second method) who agreed previously to make an appointment (date and time) for interviews

**Table 1. Profile of respondents**

Manager Gender		Manager Education		Position	
Male	90 (55%)	Ph.D.	5 people (4%)	Senior manager	37 (24%)
Female	47 (34%)	Master degree	64 people (55%)	Procurement manager	40(32%)
		Bachelor degree	68 people (41%)	Marketing manager	33 (24%)
				IT manager	10 (8%)
				Others	17 (9%)

later. Then the researcher visited each enterprise and administered the questionnaire in person. After each initial interview, participants were asked to suggest other participants that might be willing to participate in the research and so on with other participants. The snowball process provided about 148 additional potential participants, and 94 out of them participated in the project. The entire process of selection provided 133 responses during two months from June to July, 2013.

**Data Collection for the 2016 Interview Study**

Within the initial invitation letter of the 2013 quantitative study, researchers not only asked the participants to take the survey, but also asked him/her to have a follow-up interview in next year. For the purpose of enhanced effectiveness of interview, all interviews averaged about forty-five minutes in length and were conducted in person. The interviews included discussion of the company’s use of B2B ecommerce and the reasons behind such adoption decisions, following an interview guideline that was emailed to the interviewee for review at least 72 hours in advance. The interview guideline provided interviewees with a script that had a similar schedule in the survey so that interviewees had a good idea and confidence about the interview. Interviews were carried out in September 2016.

The interview procedure worked as follows. The author began with factual information about the kind of e-commerce technologies and/or activities the company was using and/or engaging in. The researchers next asked about the already and intended changes of e-commerce adoption within the company. The researchers then entered a group of questions about the industrial, governmental, legal and cultural effects on the company’s e-commerce decision. Lastly, the researchers asked the interviewees to rank the importance of influential factors that affected their decisions of e-commerce adoption. The researchers also asked whether there was any contributing factor that the study had not mentioned yet. There have been nine enterprises agreed to participate the interview and in fact there have been a total of four interviews conducted.

**Demographics of Respondents and Their Enterprise**

As described above, the researchers have reached 250 SMEs (i.e. 70 firms from the random systemic sampling technique, 63 companies from the “personal introduction” sampling technique, and 148 ones in the “snowball” method) to survey but only 137 completed questionnaires were collected, refined, and coded. Therefore, the response rate is 53%. Characteristics of demographic information of the respondents and their enterprises were analyzed and provided in Tables 1 and 2, respectively.

All enterprises of the sample admitted that they have their own websites and use one or several of e-commerce innovations in business activities. It implies that all firms of the present sample should be considered as adopters. Considering the profile of the respondents and their enterprises, it can be said that the responses can be confidently relied upon. Table 3 shows the related information in detail.



Table 2. Profiles of enterprises

Business Sector		Number of Employee	
Manufacturing industry	59 firms (43%)	<20	12 (9%)
Service sector	56 firms (41%)	20-50	47 (34%)
Construction sector	15 firms (11%)	51-100	42 (30%)
Other industries	7 firms (5%)	>100	36 (27%)

### Data Screening

In order to address missing data, in this study, listwise deletion method was used, and there have been 4 uncompleted questionnaires deleted. Regarding multivariate analyses in correlations, SEM is very vulnerable to outliers (Hair et al., 2006). In this study, we used SPSS 19.0 calculating Cook's D to measure multivariate outliers. There was no Cook's D larger than 1 from the regression; this means that there was no case for deletion.

It needs also to test whether or not statistical difference exists between the two sample groups: one used the English version of questionnaire and one used the Arabian version of questionnaire. In this study, independent-samples t test was used to compare demographic variables, such as managers' gender, manager' educational degree, business sector and employee number of enterprises from the two groups: (1) using the English version and (2) using the Arabian version. The descriptive statistics results indicated there was no difference in mean scores between the groups being compared; for example regards to gender  $t(131) = 0.57, p = 0.57$ , regards to business sector,  $t(131) = 0.526, p = 0.60$ . This means that there is no concern that responses sampled from the two versions of questionnaire to be different. Additionally, it need also to test whether or not statistical difference exists between the three sample groups: one group of 14 participants from the "random-systemic-selected" 70-sample list, the second group of 25 participants from the "personal-introduction" 32-sample list, and the third group of 94 participants from the "snowball" 148-sample list. The independent-samples t test was also used to compare demographic variables, such as managers' gender, manager' educational degree, and business sector. The results also indicated that there was no difference in mean scores between the groups being compared.

### Instrument Development

Before conducting the instrument development, the research constructs were conceptualized to specify the domains associated with e-commerce activities. Based on the result of the existing relevant literature review discussed in the previous section, conceptual definitions of constructs are developed and shown in Table 4.

Development of the instrument followed the guidelines present by Moore & Benbasat (1991). Accordingly, this process includes three stages. The first stage was item creation. Its purpose was

Table 3. Category of firms in terms of the level of e-commerce adoption

Category	Simple E-Commerce Innovations Implemented	Many E-Commerce Innovations Implemented	Total
Static or interactive websites	98	33	129
Transactive or integrated websites and connect to e-platforms	0	6	6
Total	98	39	137

Table 4. Definition/ description of latent variables

Variables	Definitions/Description	References
Perceived government supports (GovS)	Represents the things reflect the role of government and its institutions, in orienting, supporting, regulating and managing, and monitoring e-commerce environment. It includes four facets: strategic directive role (having visions or macro plans and commitment), practical directive role (having e-Government initiates), management role to stop or eliminate risks in e-transaction (having legal documents, regulations), and supporting role (having supporting policies regarded to human, finance, and technique.)	Molla & Licker (2005), Ruikar et al. (2006), Saprikis (2013)
Perceived legal and regulations system (PLR)	Represents legal requirements and regulations to stop or eliminate risks in e-business transactions; so as to ensure the security of e-commerce activities and improve trust in e-transactions.	Kog (2010); Ismail & Kamat (2006); APEC (2006)
Perceived market forces (MFS)	It refers to the assessment that the pressure from business competitors and supports from partners (such as customers and suppliers) in conducting e-business.	Molla & Licker (2005); Burns & Burns (2008)
Social awareness of e-commerce (SW)	Represents issues related to social culture, knowledge, and attitudes of a community towards e-commerce. It has four facets: (1) industrial economic characteristics (competitiveness, transparency, stableness; trend of collaboration and cooperation), (2) industrial socio-culture characteristics (trust, beliefs, concepts, judgments, expectations, and methodologies towards e-commerce) that are shared by people and enterprises within the industry. (3) They are also industrial knowledge characteristics (perception of e-commerce, skilled labor force, technicians, IT-oriented managers) that required for the development of e-commerce strategy, and (4) industrial knowledge sharing supporting infrastructure (all initiatives, actions, and plans available that develop knowledge and positive culture for e-commerce).	Ismail & Kamat (2008); Zhu et al. (2006); Huang (2009)

to create pools of items for each variable by identifying items from existing scales, and by creating additional items, that appeared to fit the construct definitions. The second stage was scale development. The basic procedure was to have panels of judge sort the items from the first stage into separate categories, based on the similarities and differences among items. Then the items was examined and dropped if any inappropriate wording or ambiguousness. The third stage was to test the overall instrument with the various scales developed previously. This stage includes three separate steps. First, the instrument was distributed to a small sample of respondents and then an analysis of the responses was carried out to get an initial indication of the scales' reliability. Items which did not contribute to the reliability were dropped from a full pilot test with a larger number of subjects. In the third step, the scales were further refined, and a field test of the instrument was conducted. The final questionnaire was shown in Appendices A.

## DATA ANALYSIS

The research hypotheses were tested using structural equation modeling (SEM) implementing partial least squares (PLS) technique.

### Assessment of Measurement Model

Prior to data analysis, three measurement properties need to be examined to ensure that the model has a satisfactory level of reliability and validity. To evaluate individual item reliability, the standardized loadings (or simple correlation) were assessed. A rule of thumb employed by many researchers is to accept items with loadings of 0.7 or more, which implies that there is more shared variance between

Table 5. AVE and Cronbach's Alpha

Reflective Constructs	AVE	Cronbach's Alpha
GovS	0.7170	0.7882
MFS	0.6675	0.8864
PLR	0.6293	0.7961
SW	0.6192	0.8562
eCIA	0.6634	0.8715
eCI	0.7030	0.7040
Benchmark	0.5	0.6

the latent variables and its measure than error variance. Based on the output of confirmatory factor analysis (CFA) from Smart-PLS 2.0 M3, all items have loadings above 0.70. In addition, the loadings are all statistically significant. Therefore, it can be said that all the items demonstrate satisfactory level of individual item reliability.

Second, convergent validity was also examined by evaluating Cronbach's alpha by SPSS 19.0. This is to measure the internal consistency. It is estimated to ensure that the items assumed to measure each latent variable measures them and not measuring another latent variable. The Cronbach's alpha obtained for each construct is listed in Table 5. All constructs have acceptable convergent validity, as a value of 0.70 is usually accepted as the minimum desired value of the Cronbach's alpha.

Third, the discriminant validity of the measurement scale was tested. The analysis of cross-loading was carried out by following the rule that items should have a higher correlation with the latent variable that they are supposed to measure than with any other latent variable in the model (Chin, 1998). First, SmartPLS 2.0 M3 was used to generate the latent variable scores for all the six reflective variables and standardized scores for each measurement item. Next, these scores were then entered into SPSS 19.0 to calculate Pearson's correlation coefficients for all the items. The Pearson correlation results are present in Table 6. The results showed that all items loaded higher on the latent variable they were theoretically specified to measure than any other latent variable in the model (see the highlighted correlation coefficients). In other words, the analysis demonstrated discriminant validity of the six latent variables.

In PLS, analysis of average variance extracted (AVE) is also useful for assessing the adequacy of discriminant validity at construct level. Accordingly, a latent variable should share more variance with its measures than it shares with other latent variables. AVE of a latent factor should be greater than the variance shared between the latent factor and other latent factor (e.g. the squared between two latent factor). The rule is that the square root of AVE of each latent variable should be larger than the correlation of two latent variables. Here, the correlation matrix for the latent factors was established (see Table 7). The results show that there was no correlation between any two latent variables larger than or even equal to the square root AVEs of the two latent variables. Thus, the analysis demonstrated discriminant validity. Therefore, having satisfied the three measurement properties, it can be concluded that the constructs are measured with adequate precision.

### Assessment of Structural Model

Table 8 contains a summary of the hypotheses, the path coefficients obtained from the PLS analysis, the t-values, and associated levels of significance for each path.

Table 6. The cross loadings of constructs

Items	GovS	MFS	LRS	SW	eCI	eCIA
GovS1	<b>0.85</b>	0.52	0.32	0.65	0.67	0.70
GovS2	<b>0.86</b>	0.43	0.23	0.78	0.83	0.80
GovS3	<b>0.84</b>	0.74	0.70	0.65	0.32	0.69
GovS4	<b>0.88</b>	0.72	0.60	0.32	0.23	0.70
GovS5	<b>0.97</b>	0.10	0.72	0.23	0.70	0.82
GovS6	<b>0.79</b>	0.74	0.43	0.40	0.80	0.73
MFS1	0.32	<b>0.65</b>	0.53	0.20	0.52	0.40
MFS2	0.23	<b>0.79</b>	0.22	0.52	0.32	0.32
MFS3	0.40	<b>0.81</b>	0.12	-0.01	0.23	0.23
MFS4	0.20	<b>0.87</b>	0.13	0.32	0.40	0.32
MFS5	0.52	<b>0.91</b>	0.03	0.33	0.20	0.23
MFS6	-0.20	<b>0.91</b>	0.08	0.54	0.52	0.40
MFS7	0.54	<b>0.91</b>	0.42	0.44	0.12	0.20
PLR1	0.22	-0.12	<b>0.83</b>	0.12	0.13	0.52
PLR 2	-0.10	0.54	<b>0.85</b>	0.13	-0.05	0.54
PLR 3	0.34	0.22	<b>0.81</b>	0.03	-0.08	0.22
PLR 4	-0.32	0.10	<b>0.79</b>	0.08	0.42	-0.12
PLR 5	0.23	0.34	<b>0.88</b>	0.42	0.54	-0.13
SW1	0.40	0.32	0.12	<b>0.85</b>	0.22	-0.04
SW2	-0.20	0.23	0.43	<b>0.82</b>	0.12	-0.00
SW3	0.52	0.40	0.54	<b>0.80</b>	0.13	0.12
SW4	0.77	0.62	0.52	<b>0.77</b>	0.03	0.13
eCI1	-0.20	0.34	-0.22	0.22	<b>0.81</b>	0.20
eCI2	-0.12	0.32	0.52	-0.10	<b>0.86</b>	0.52
eCI3	0.43	0.23	0.32	0.34	<b>0.88</b>	0.85
eCI4	0.54	0.40	0.23	0.32	<b>0.78</b>	0.66
eCI5	-0.22	-0.32	0.40	0.23	<b>0.85</b>	0.75
eCIA1	0.70	0.63	0.52	0.70	0.90	<b>0.98</b>
eCIA2	0.84	0.70	0.83	0.60	0.90	<b>0.98</b>

Legend: The highest Pearson Correlation coefficient is highlighted

### Test of Predictive Validity of the Structural Model

The explanatory power of the model was assessed by examining the amount of variance in the dependent variable that can be explained by the model. Smart-PLS 2.0 3M provided the squared multi correlations (R2) for two dependent variables in a model. In this study, the R2 for “e-commerce initial adoption” and “e-commerce institutionalization” are 0.50 and 0.45 respectively meaning that about 50% and 45% of the changes in the entry-level adoption and institutionalization of e-commerce in SMEs is due to the four institutional variables in the model. Now, it can be summarized that the modified model and its instrument are sufficiently valid to explain adoption and institutionalization of e-commerce in SMEs.

Table 7. The correlation of constructs and the square root of AVE

Items	GovS	MFS	PLR	SW	eCI	eCIA
GovS	<b>0.847</b>					
MFS	0.134	<b>0.817</b>				
PLR	0.321	0.122	<b>0.793</b>			
SW	-0.001	0.441	0.411	<b>0.840</b>		
eCI	0.120	-0.022	0.205	0.383	<b>0.840</b>	
eCIA	0.331	0.088	0.277	0.321	0.82	<b>0.980</b>

### Test of Research Hypotheses

Each hypothesis was tested by looking at the sign, size, and statistical significance of the path coefficient between the independent and dependent variable. The bootstrap function in Smart-PLS 2.0 3M was used with 200 re-samples. Five of the eight paths are statistically significant (see Table 8). For e-commerce initial adoption (eCIA), two of the four institutional factors – GovS and PLR – have significant paths. For institutionalization of e-commerce (eCI), three of the four institutional factors –SW, PLRS, and MFS – have significant paths.

### The 2016 Follow-Up Interview Data Analysis

The qualitative data is collected in the face-to-face manner with four specific participants in September 2016. The analysis and results of those qualitative interviews helped the researcher clarify the participants' responses in the full survey and complemented the previous quantitative analyses and results. The following report on the qualitative interviews was present in descriptive narrative and succinct form, categorized into five headings corresponding to two dependent variables and four independent variables in the quantitative results, and supported by interview participants' quotations (in italics in the following texts). This approach of analyzing the interview data was suited to the relatively small number of interviews in this study and the purpose of cross validating the effects of four institutionally influential factors for e-commerce adoption.

The first company was coded as SME1. According to its website, SME1 was a sport equipment manufacturing company. It had more than 150 employees. Its key customers included schools,

Table 8. Path coefficients and t values

Path	Expected Sign	Path Coefficients	t-Values	Inference
Dependent construct: E-commerce Initial Adoption (eCIA)				
H1a: GovS->eCIA	+	0.13	1.75*	Supported
H5a: LRS ->eCIA	+	0.16	1.99*	Supported
Dependent construct: Intention for E-commerce Institutionalization (eCI)				
H5b: LRS ->eCI	+	0.43	3.73**	Supported
H3b: SW ->eCI	+	0.34	4.21**	Supported
H2b: MFS ->eCI	+	0.21	2.53**	Supported

Legend: \*\*=highly significant, \*=significant; critical t-value: 1.96 p<0.05 and 2.58 p<0.01

sport centers, and organizations. Its strategic partners included local small and large enterprises. Its products and services included sport equipment of which the prices range from US\$5 to over 10,000. In previous years, SEM1 average R&D investment was around US\$ 30,000. The interviewee was a process improvement manager at the company, focusing on strategic business planning and organizational development. He had over 25 years of experience ranging from an officer to a member of senior management.

The second company was coded as SME2. It was a local branch of a China-based Zhongfong manufacturing company. Its major products were pet foods. It had over 100 employees. Its primary customers were farms. The interviewee had worked for three years in a position for procurement management and had recently served as a member of a regional business management team.

The last company was coded as SME3. It was an advertising agency company focusing on online advertising and public relations, interactive marketing, and media resource planning and purchasing. Its primary customers were online gaming vendors and operators. SME3 was a small company with about 50 employees in Riyadh. The interviewee was a director of technology for five years ago. The results are discussed in detail in the following sub-sections.

### *Initial Adoption of E-Commerce and Intention for E-Commerce Institutionalization*

With regard to the sophistication and usage level of B2B e-commerce adoption, SME1 was still in the stage of “initial adoption” in 2016, meanwhile SME2 and SME3 were at the more sophisticated e-commerce level.

As for SME1, its major B2B partners were retailing vendors. Its business transactions with those external vendors had involved B2B e-commerce at the simple level since 2010 and continue to now. Two examples given are that the enterprise started to use e-mail since 2010, and established a static website since 2011, respectively. Then it improved their websites to the interactive websites years later to make promotions and publish basic company information or receive queries, e-mail, and form entry from users. At presently, a quite much part of electronic fund transfer has been conducting electronically through e-banking systems. However, the company does not have an online CRM or SCM systems. The interviewee from SME1 also confirmed that back in 2013; her company “had no organized or systematic operations of electronic purchasing.” She also admitted that SME1 was not early adopters of e-commerce because of the concern of return-of investment of new technology and IT infrastructure barriers. And that SME1 does not have any plan to invest and improve its initial e-commerce status in near future. The interviewee also said that SME1’s “IT infrastructure is not strong enough,” and its overall intention level of e-commerce institutionalization was “at very low level.” These are consistent with the 2013 full survey. The scores of initial B2B e-commerce adoption (eCIA) and of intention for e-commerce institutionalization (eCI) of SME1 in the 2013 full survey were 3.7 and 2.2 out of 5, respectively.

As for SME2, at present this company is at the middle institutionalization level of e-commerce. In the 2016 interview, the interviewee told that SME2 invested and retrofitted the initial e-commerce status to become a more sophisticated e-commerce system in 2015. Especially, the new system of e-commerce is integrated with e-marketplace and aligned with the company’s new business strategy. In early 2016, SME2 “began to adopt e-commerce based on a third-party purchasing platform provided by Ariba.” Since then, all long operations of SME2’s purchasing had been through this platform. With the close cooperation with Chinese, SME2 had adopted B2B e-commerce extensively in its supply chain. Integrating its purchasing platform with its internal ERP system provided by SAP, SME2 was able to place orders with its suppliers online and its suppliers were able to take the orders on a real-time basis. SEM2 also used EDI to share information internally with its parent company in the U.S. and peer companies in Europe. However, it was still at a low level in SME2 with respect to electronic data interchange of order and sales with external business partners, including suppliers and customers. The “intention for B2B e-commerce institutionalization (eCI)” items for SME2 have been received high scores in the 2013 full survey, and the overall score of eCI was 4.0 out of 5.

As an online advertising company with about ten years old, SME3 is presently at the high level of e-commerce institutionalization. It “has been using e-commerce more and more frequently because the overall e-commerce development in Saudi Arabia has become more and more mature, especially in IT sector.” The eCIA and eCI scores of SME3 based on the 2013 full survey were 2.18 and 4.1 out of 5. As a newly founded online business solution provider itself, SME3 had the highest score of eCI among three interviewed companies in 2013. Its response in the 2016 interview survey showed that SME3 had been using or at least intended to use most of the e-commerce technologies listed in the survey, except for receiving customer orders on the company’s website. The company normally assigned specific a sales and customer service representative to each customer. Although the customers themselves were unable to place orders over the Internet directly, the company’s representatives could place orders for the customers over the company’s intranet. In the near future, SME3 planned to develop and implement an e-business system that would integrate better with its customers. It hoped to “involve more in e-commerce and expand its usage.” It had a strong customer-oriented application of web-based e-commerce technologies, such as a multi-functional website, EDI system and CRM system. SME3’s interviewee specified the sales model of the company—SAS (software and service), which treated the product of software as a kind of service and offered this service online, with the abilities to provide technical support and customer communication and deliver software upgrades all online.

### *Ranking Institutional Factors*

All interviewees were asked to rank the institutional factors’ effects on their decision of B2B e-commerce adoption. For a decision of initial adoption of e-commerce, “government support” and “legal and regulations” received the highest rank across all interviewees; and “market forces” and “social awareness” factors in order. For a decision of e-commerce institutionalization, the “social awareness”, “legal and regulations”, and “market forces” received the highest rank across all interviewees, and the “government supports” factor in order.

In addition, regarding SME2 that was at the initial level of e-commerce adoption in 2013, GovS and PLR were the two institutional factors only influencing on their decision of e-commerce adoption. For 2016 as SME2 has an intention for at the more sophisticated level of e-commerce adoption, MFS, PLR, and PSW were in the three top in order predicting its e-commerce adoption. Regarding SME3, when it was at the initial level of e-commerce in 2013, GovS and PLR were also the two institutional determinants of their decision of e-commerce adoption only. In 2016 as SME3 is already at the institutionalization of e-commerce, MFS, PSW, and PLR were in the three top in order predicting its decision of e-commerce. Regarding SME1 that did not change its adoption level between 2013 and 2016, and rankings of the institutional factors also did not change.

Thus, it can be said that there is a clear change in terms of institutionally influential factors of e-commerce adoption over time in each enterprise as the level of e-commerce adoption changes. This result is consistent with the quantitative data analysis that indicated that predictors differ for initial e-commerce adoption and intention for e-commerce institutionalization.

## **DISCUSSION**

Data analysis showed that GovS had significant influence a decision of initial adoption of e-commerce but did not have any impact on intention for e-commerce institutionalization in Saudi SMEs. This finding is completely consistent with the result reported by Leung et al. (2005) and the conventional wisdom that emphasizes the influence of the macro-environment on entry-level e-commerce adoption (Molla & Licker, 2005).

For the reason of this finding, in developing countries, competitive environment is often determined by the relationship between businesses and government, and additionally, business managers in SMEs often trend to be oriented by government’s directions and less willing to accept changes (Huang et al., 2014). Furthermore, in the Kingdom of Saudi Arabia, at presently, there is an

absence of government responsibility for e-commerce as well as no long and short -term strategic plans for the e-commerce environment development. Saudi people tend to feel more confident in business ventures if they are backed by the Government. Therefore, SMEs in the KSA more likely move to e-commerce at the entry-level if they receive enough government's supports in terms of regulation, laws, financing, and technical issues, however a decision of e-commerce maturity and sophistication in Saudi SMEs may depend much more on other factors; for example, managers' commitment, and resources.

Perceived legal and regulations support is the most significant institutional determinant of both the entry-level adoption and institutionalization of e-commerce in Saudi SMEs. This result is consistent with previous empirical findings (Molla & Licker, 2005). Our finding gives empirical support to qualitative research that identifies many legal obstacles to e-commerce, such as inadequate legal protection for online transactions, unclear business laws, and security and privacy concerns (Ismail & Kamat, 2006; Kog, 2010). By implication, this result points to the need for establishing a broad legal and institutional framework that makes a trustworthy e-marketplace.

Perceived market forces were found to have significant effects on only intention for e-commerce institutionalization in Saudi SMEs. This finding is completely consistent with the results reported by Molla & Licker (2005). It is also supported by (Tran et al., 2014) when they found that external business characteristics were critical factors affecting the institutionalization of e-procurement in construction industry in Vietnam. They confirmed the importance of meso-level environmental factor in e-commerce adoption, as market forces tend to be relatively specific to a given sector and industry. In fact, in the KSA, enterprises consider consumer purchasing power to be weak and not support them to run e-commerce. They are just waiting to see how the e-marketplace develops. This result indicates that the extent to which e-commerce is used by different business partners can motivate SMEs toward more sophisticated e-commerce implementation because of perceived benefit values or fear of market displacement or forces from partners towards supply chain integration.

Perceived social awareness of e-commerce was found to have significant impact on institutionalization but not on a decision of initial adoption of e-commerce in SMEs. The result is supported by empirical findings in other developing countries (Tran et al., 2014). This implies that information sharing culture, positive perception of the role of information, and positive attitudes toward IT and e-commerce by people will be critical for SMEs in implementing sophisticatedly e-commerce (Teo et al., 2009). Such characteristics are all the more important in developing countries, such as KSA, where information sharing is facing the "rigidity" of public administration and even private businesses.

## **CONCLUSION**

The analysis result in 2013 and 2016 demonstrated that there is a clear difference between initial e-commerce adoption and intention for e-commerce institutionalization in SMEs in terms of institutional predictors. Supports of government and perceived legal and regulations supports are more critical in pulling SMEs towards a decision of initial e-commerce adoption rather than intention for e-commerce institutionalization. When e-commerce adoption was at its infant stage, supports from governmental initiatives and legal systems were instrumental and served as initial institutional forces to encourage firms to adopt e-commerce. Meanwhile, perceived industrial pressures (i.e. market forces), and perceived social awareness pushed initial adopters to engage in e-commerce more sophisticatedly. As time went on, the effect of government supports become insignificant but these factors remained relatively stable.

This study extended the institutional theory by adding a new research lens—time. Employing such a temporal lens provides a new and powerful way to investigate and better understand the contextual factors for e-commerce adoption at different stages in SMEs. The study has following limitations, such as limited generalizability for the other regions in Middle East, not diversified data in terms of



geographical regions, and small sample size. Additionally, the research instrument should be tested for test–retest reliability and external validity. Replicating the study would enable such tests. Some respondents suggested that the issues addressed in our study should be conducted in specific industries because different industries may have different considerations in their adoption of e-commerce due to various institutional pressures. Finally, moderating factors should be taken into consideration while analyzing institutional relationships on e-commerce adoption.

## **ACKNOWLEDGMENT**

This research was supported by the Scholarship of Nanjing University of Aeronautics and Astronautics.

## REFERENCES

- Al-Qirim, N. (2008). The adoption of eCommerce communications and applications technologies in small businesses in New Zealand. *Electronic Commerce Research and Applications*, 6(4), 462–473. doi:10.1016/j.elerap.2007.02.012
- Al-Rawi, K., Sabry, K., & Al-Nakeeb, A. (2008). Driving factors for e-commerce: Gulf region review. *Academy of Information and Management Sciences Journal*, 11(2), 19.
- AlGhamdi, R., Nguyen, J., Nguyen, A., & Drew, S. (2012). Factors influencing e-commerce adoption by retailers in Saudi Arabia: A quantitative analysis. *International Journal of Electronic Commerce Studies*, 3(1), 83–100.
- APEC. (2006). The final report on transparency in procurement and e-Procurement. *Paper presented at the APEC Senior Officials' Meeting (SOM III)*, Ha Noi, Viet Nam.
- Batenburg, R. (2007). E-procurement adoption by European firms: A quantitative analysis. *Journal of Purchasing and Supply Management*, 13(3), 182–192. doi:10.1016/j.pursup.2007.09.014
- Burns, R., & Burns, R. (2008). *Business Research Methods and Statistics Using SPSS*. SAGE Publications Ltd.
- Chan, F. T. S., Yee-Loong Chong, A., & Zhou, L. (2012). An empirical investigation of factors affecting e-collaboration diffusion in SMEs. *International Journal of Production Economics*, 138(2), 329–344. doi:10.1016/j.ijpe.2012.04.004
- Chiang, I. R., & Nunez, M. A. (2013). Strategic alignment and value maximization for IT project portfolios. *Information Technology Management*, 14(2), 143–157. doi:10.1007/s10799-012-0126-9
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research*, 295(2), 295–336.
- Chong, A. Y.-L., Ooi, K.-B., & Sohal, A. (2009). The relationship between supply chain factors and adoption of e-Collaboration tools: An empirical examination. *International Journal of Production Economics*, 122(1), 150–160. doi:10.1016/j.ijpe.2009.05.012
- Featherman, M. S., & Pavlou, P. A. (2003). Predicting e-services adoption: A perceived risk facets perspective. *International Journal of Human-Computer Studies*, 59(4), 451–474. doi:10.1016/S1071-5819(03)00111-3
- Ghobakhloo, M., Benitez-Amado, J., & Arias-Aranda, D. (2011). Reasons for information technology adoption and sophistication within manufacturing SMEs. *Paper presented at the The POMS 22nd Annual Conference: Operations Management: The Enabling Link - 2011*.
- Gibbs, L. J., & Kraemer, K. L. (2004). A cross-country investigation of the determinants of scope of e-commerce use: An institutional approach. *Electronic Markets*, 14(2), 124–137. doi:10.1080/10196780410001675077
- Gosain, S. (2004). Enterprise Information Systems as Objects and Carriers of Institutional Forces: The New Iron Cage. *Journal of the Association for Information Systems*, 5(4), 151–182. doi:10.17705/1jais.00049
- Gunasekaran, A., & Ngai, E. W. T. (2008). Adoption of e-procurement in Hong Kong: An empirical research. *International Journal of Production Economics*, 113(1), 159–175. doi:10.1016/j.ijpe.2007.04.012
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis*. NJ: Pearson Prentice Hall Upper Saddle River.
- Huang, D. C., Tran, Q. D., Nguyen, T. Q. T., & Nazir, S. (2014). Initial Adoption vs. Institutionalization of E-Procurement in Construction Firms: The Role of Government in Developing Countries. *International Journal of Enterprise Information Systems*, 10(4), 1–21. doi:10.4018/ijeis.2014100101
- Huang, L. K. (2009). The Contingent Role of Innovation between IT Management Sophistication and Strategic Alignment. *Journal of Global Information Management*, 17(2), 60–92. doi:10.4018/jgim.2009040103
- Ifinedo, P. (2011). An empirical analysis of factors influencing Internet/e-business technologies adoption by SMEs in Canada. *International Journal of Information Technology & Decision Making*, 10(04), 731–766. doi:10.1142/S0219622011004543

- Ismail, I., & Kamat, V. (2006). Evaluation of Legal Risks for E-Commerce in Construction. *Journal of Professional Issues in Engineering Education and Practice*, 132(4), 355–360. doi:10.1061/(ASCE)1052-3928(2006)132:4(355)
- Ismail, I. A., & Kamat, V. R. (2008). Integrated Multi-Disciplinary e-Business Infrastructure Framework. In C. J. Anumba & K. Ruikar (Eds.), *E-Business in construction* (Vol. 65-80). West Sussex, UK: Blackwell Publishing Ltd. doi:10.1002/9781444302462.ch5
- Jeon, B. N., Han, K. S., & Lee, M. J. (2006). Determining factors for the adoption of e-business: The case of SMEs in Korea. *Applied Economics*, 38(16), 1905–1916. doi:10.1080/00036840500427262
- Kim, N. A. (2005). *Survey on electronic procurement implementation in Malaysia construction companies* [Master thesis]. University Technology Malaysia, Malaysia.
- Kiong, L. V. (2004). *Analysis of the State of E-Commerce Adoption by the SMEs in Northern Malaysia and Factors that Might Hinder its Adoption: An Empirical Study* [Doctoral dissertation]. University of South Australia, Australia.
- Kog, Y. C. (2010). Legal Issues of Integrated Network for Construction and Real Estate Sector. *Journal of legal affairs and dispute resolution in engineering and construction*, 2(4), 228-235.
- Leung, M. Y., Ng, S. T., Skitmore, M., & Cheung, S. O. (2005). Critical stressors influencing construction estimators in Hong Kong. *Construction Management and Economics*, 23(1), 33–44. doi:10.1080/01446190410001678099
- Lip-Sam, T., & Hock-Eam, L. (2011). Estimating the determinants of B2B e-commerce adoption among small & medium enterprises. *International Journal of Business and Society*, 12(1), 15.
- Luqman, A., & Abdullah, N. K. (2011). E-business adoption amongst SMEs: A structural equation modeling approach. *Journal of Internet Banking and Commerce*, 16(2), 1.
- Molla, A., & Licker, P. S. (2005). Perceived e-readiness factors in e-commerce adoption: An empirical investigation in a developing country. *International Journal of Electronic Commerce*, 10(1), 83–110.
- Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2(3), 192–222. doi:10.1287/isre.2.3.192
- Oxley, J., & Yeung, B. (2001). E-commerce readiness: Institutional environment and international competitiveness. *Journal of International Business Studies*, 32(4), 705–724. doi:10.1057/palgrave.jibs.8490991
- Rogers, E. M. (1995). *Diffusions of Innovations*. 4th. New York: Free Press.
- Ruikar, K., Anumba, C. J., & Carrillo, P. M. (2006). VERDICT - An e-readiness assessment application for construction companies. *Automation in Construction*, 15(1), 98–110. doi:10.1016/j.autcon.2005.02.009
- Saprikis, V. (2013). Suppliers' behavior on the post-adoption stage of business-to-business e-reverse auctions: An empirical study. *Telematics and Informatics*, 30(2), 132–143. doi:10.1016/j.tele.2012.04.002
- Scott, W. R. (2005). Institutional theory: Contributing to a theoretical research program. In *Great minds in management: The process of theory development* (pp. 460-484).
- Tarafdar, M., & Vaidya, S. D. (2006). Challenges in the adoption of E-Commerce technologies in India: The role of organizational factors. *International Journal of Information Management*, 26(6), 428–441. doi:10.1016/j.ijinfomgt.2006.08.001
- Teo, H. H., Wei, K. K., & Benbasat, I. (2003). Predicting intention to adopt interorganizational linkages: An institutional perspective. *Management Information Systems Quarterly*, 27(1), 19–49. doi:10.2307/30036518
- Teo, T. S. H., Lin, S., & Lai, K. (2009). Adopters and non-adopters of e-procurement in Singapore: An empirical study. *Omega*, 37(5), 972–987. doi:10.1016/j.omega.2008.11.001
- To, M. L., & Ngai, E. W. T. (2006). Predicting the organisational adoption of B2C e-commerce: An empirical study. *Industrial Management & Data Systems*, 106(8), 1133–1147. doi:10.1108/02635570610710791
- Tran, Q., Huang, D., & Zhang, C. (2013). An assessment method of the integrated e-commerce readiness for construction organizations in developing countries. *International Journal of E-Adoption*, 5(1), 37–51. doi:10.4018/jea.2013010103

Tran, Q., Zhang, C., Sun, H., & Huang, D. (2014). Initial adoption versus institutionalization of e-procurement in construction firms: An empirical investigation in Vietnam. *Journal of Global Information Technology Management*, 17(2), 91–116. doi:10.1080/1097198X.2014.928565

Wang, W. Y. C., Heng, M. S. H., & Chau, P. Y. K. (2010). The adoption behaviour of information technology industry in increasing business-to-business integration sophistication. *Information Systems Journal*, 20(1), 5–24. doi:10.1111/j.1365-2575.2008.00298.x

Yuan, J. H., Xu, Y., Hu, Z., Yu, Z. F., Liu, J. Y., Hu, Z. G., & Xu, M. (2012). Managing electric power system transition in China. *Renewable & Sustainable Energy Reviews*, 16(8), 5660–5677. doi:10.1016/j.rser.2012.05.046

Zhu, K., & Kraemer, K. L. (2005). Post-adoption variations in usage and value of E-Business by organizations: Cross-country evidence from the retail industry. *Information Systems Research*, 16(1), 61–84. doi:10.1287/isre.1050.0045

Zhu, K., Kraemer, K. L., & Xu, S. (2006). The process of innovation assimilation by firms in different countries: A technology diffusion perspective on e-business. *Management Science*, 52(10), 1557–1576. doi:10.1287/mnsc.1050.0487

Zhu, L. (2008). *The institutional environment for B2B e-commerce adoption* [Doctoral dissertation]. University of Arizona.

*Almaaf Bader received his BS degree in Computer Science, Information System from FBS University, Saudi Arabia in 2009 and his Master's degree in Economics and International Trade from Nanjing University of Science and Technology, China in 2012. Presently, he is a Ph.D. candidate in Management Science and Engineering in Nanjing University of Aeronautics and Astronautics, Nanjing, China.*

*Jian-Jun Miao is a full professor in College of Economics and Management, Nanjing University of Aeronautics and Astronautics, Nanjing, China. His research interests are in Humanities & Social Sciences.*

*Quangdung Tran is presently a lecturer at National University of Civil Engineering, Vietnam. He was an Endeavour Research Fellow at Griffith University in 2015. He received his MS in Management Science and Ph.D. degree in Technical Economics and Management from Hohai University in 2009 and 2014, respectively. His research activities focus mainly on project management, IT management, and sustainable management in the construction sector. Mr. Tran has published over 20 articles in international journals, such as Journal of Global Information Technology Management, Employee Relations, International Journal of E-Adoption, Information Technology Journal, WSEAS Transactions on Computer, International Journal of Enterprise Information Systems.*