A construction enterprise’s readiness level in implementing e-procurement: a system engineering assessment model

Quangdung Tran*, Dechun Huang, Binhsheng Liu, Hossain Md.Ekram

Hohai University, Nanjing 210098, China

Abstract

There have been some popular research objectives by scholars on e-procurement as to find causes to explain why the rate and speed of adoption is frequently very slow or to find management solutions related to business process reengineering, human resource development and management, technology management, etc. Our present study was pursed to develop a theoretical impact-role-factor assessment model to assist assessment the importance of government, organization, and technology on a construction enterprises’ e-procurement implementation readiness level in developing countries. The model is built based on a Government-Organization-Technology framework and positing the process of an enterprise’s readiness collection is dynamic; the readiness level is changed, increasingly or decreasingly, over time. The proposed model consists of ten the constructs with eleven the hypothesized influential relationships. The conceptual model must be tested empirically in further researches.

Keywords: e-procurement, implementation, management solution, impact role, readiness level

1. Introduction

At present, it can be said that efficiency gains from e-commerce applications, particularly e-procurement are well known and technological feasibility of implementation is ensured [1]. However, adoption and implementation of e-procurement are frequently low [2, 3], especially, the implementation in construction industry (CI) is considerably lagging behind in comparison to other industries [4, 5]. There has been much attention paid by scholars on adoption/implementation of e-procurement in CI (e.g. [3, 6]). However, the most popular objectives are to try to find causes for explaining why the rate and speed of adoption of e-procurement is low or to find management solutions. Too little attention has been paid, so far, to assess the role of relevant actors (e.g. the role of government, organization, and individuals) in improving an enterprise’s readiness level in implementing e-procurement. Our present study is carried out to pursue to close this knowledge gap.

Lou in [7] argued that the perceived benefits of IT can only be achieved if the construction organization is in a state of “readiness” to absorb effectively IT enabled innovation into its work practices prior to investment. Unfortunately, construction industry in developing countries is characterized by small and medium enterprises (SMEs) which have often a low readiness level to successfully adopt, use and benefit from IT, such as e-commerce [8]. In most developing countries, a subsidized regime still exists at different levels to make negative consequences of slackness and dependence within both state and private enterprises in reforming strategically their business...
climate. Thus regulations, legislations and supportive policies of government are believed to be very important on a firm’s adoption/implementation of e-procurement. This fact is supported by many previous studies [e.g. 9, 10, 11, 12, 13, 14, and 15]. Obviously, there exists an urgent demand to carry out research to assess how the role of government and other relevant actors influence on the readiness level of construction e-procurement implementation in developing countries; what are the solutions that really need to be addressed to improve the readiness level; and who is responsible for these works?

This present study is pursued to develop a theoretical impact-role-factor assessment model to assist assessment the role of government, organization, and technology on the readiness level in implementing e-procurement within construction enterprises. The model is built under a dynamic approach with considering as the following:

- The e-procurement implementation readiness of an enterprise is the enterprise’s propensity forward e-procurement and the enterprise’s internal available capability to implement successfully e-procurement to gain perceived benefits;
- The nature of the process of an enterprise’s readiness collection is dynamic, the readiness level is changed, increasingly or decreasingly, over time; and
- Positing a multiple-imperative impact regime on an enterprise’s e-procurement implementation readiness level includes technological, managerial, organizational, and environment imperative.

By doing this, the paper will contribute with a new dynamic definition of e-readiness and a new Government-Organization-Technology research framework on the e-procurement implementation issue, especially the theoretical impact-role-factor assessment model. To fulfill the aim, a theoretical background was presented and a comprehensive discussion about the influences of government, organization and technology on a construction enterprise’s e-procurement implementation readiness level was carried out. The model should be empirically tested in further researches.

2. Theoretical background

2.1. A construction enterprise’s e-procurement implementation readiness: a dynamic definition

According to [7], enterprises must meet “a required readiness level” to absorb effectively IT enabled innovation into its work practices prior to investment. Various definitions of readiness could be found from literature on the subject [e.g. 16, 17, 18, 20, and 21]. However, there is no specific definition for the concept of readiness because it depends on various contexts, different situations and users. In this study, the e-procurement implementation readiness of an enterprise is defined to consist of the enterprise’s propensity forward e-procurement (including managers’ perception of e-procurement; supportive policies and works which are already implemented in the enterprise to adapt to a new underlying operation and management philosophy) and its available capability (including technological, human, and business resources) before implementing e-procurement. Authors posited the enterprise’s propensity toward e-procurement as a component of the readiness because people tend to adopt better a new IT when they have more attention to use it [19]. Under this definition of readiness, an enterprise’s process of readiness collection is dynamic; the readiness level is changed, increasingly or decreasingly, over time. Our study moved away from a static, over determined perspective towards an investigation of the nature of the innovation process and the factors affecting the readiness level. Arguments in [17, 20, and 21] imply that an enterprise’s e-procurement implementation readiness must be influenced by factors from other sources, such as from internal organizational environment, external business environment, and technology characteristics.

2.2. Barriers and challenges to e-procurement implementation in CI

The e-procurement implementation in CI will face many difficulties, such as the management complexity, the need of process integration, and the complexity of a construction e-procurement system and IT infrastructure [5]. Under the definition of readiness in this study, the barriers and challenges are believed to influence considerably on the e-procurement implementation. A literature review carried out to identify main barriers and challenges to the implementation within CI in developing countries (in Table 1).
Table 1. Barriers and challenges to e-procurement implementation in CI in developing countries

<table>
<thead>
<tr>
<th>Perspectives</th>
<th>Barriers, challenges</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>The security of data transactions; A challenge in finding an affordable technical solution; Cost of investment</td>
<td>[45]; [33]; [46]; [47]</td>
</tr>
<tr>
<td></td>
<td>Lack of system integration, standardization, and compatibility issues</td>
<td>[45]; [46]; [48]; [49]</td>
</tr>
<tr>
<td></td>
<td>Construction work specifications can be less well defined with unknowns such as ground conditions</td>
<td>[50]</td>
</tr>
<tr>
<td>Management</td>
<td>The development of confidence to use new technologies</td>
<td>[45]; [31]; [46]; [48]; [49]</td>
</tr>
<tr>
<td></td>
<td>The need for personal contact, cooperation and long-term relationship with customers</td>
<td>[45]</td>
</tr>
<tr>
<td></td>
<td>Lack of technical expertise, personnel skilled; Lack of Leadership and top commitment</td>
<td>[31]; [49]</td>
</tr>
<tr>
<td></td>
<td>Lack of system knowledge; Lack of strategic management; Lack of clear vision and objectives</td>
<td>[49]</td>
</tr>
<tr>
<td></td>
<td>Construction procurement is complex with many different parties</td>
<td>[50]</td>
</tr>
<tr>
<td></td>
<td>Unstructured procurement activities provide a high degree of complexity to make the use of electronic systems</td>
<td>[37]</td>
</tr>
<tr>
<td>Organization</td>
<td>The challenge of shifting the mind-set of people wanting to stay with the current system</td>
<td>[45]; [31]; [49]</td>
</tr>
<tr>
<td></td>
<td>A complex organizational hierarchical structure; The industry fragmentation; One-off projects feature</td>
<td>[50]</td>
</tr>
<tr>
<td></td>
<td>Lack of resources, Different organizational culture</td>
<td>[48]; [49]</td>
</tr>
<tr>
<td>Environment</td>
<td>Lack of a national IT policy relating to E-Procurement Issues</td>
<td>[31]</td>
</tr>
<tr>
<td></td>
<td>Lack of an effective legal and regulation system</td>
<td>[31]</td>
</tr>
<tr>
<td></td>
<td>Poor IT infrastructure</td>
<td>[31]; [49]</td>
</tr>
<tr>
<td></td>
<td>Lack of marketplace and supplier’s readiness, a “wait-and-see” attitude among firms; Reluctance to share data with trading partners</td>
<td>[46]; [47]; [48]</td>
</tr>
<tr>
<td></td>
<td>Lack of demand from customer/client; Lack of pressure from competitors; Lack of corporate executive level support</td>
<td>[49]</td>
</tr>
</tbody>
</table>

2.3. Innovation adoption theories: a proposed framework of modeling

According to the review of the literature on e-Commerce adoption, authors found that most of the models and frameworks have not given a comprehensive account for e-commerce technologies' adoption. Each of them has a certain assumption about the source of impact factors on adoption of IT technologies and provides different explanations on the situation of adoption of e-commerce or IT in general in a specific context. For example, the Unified Theory of Acceptance and Use of Technology [22, 23], the Technology-Organization-Environment model [24, 25, and 26], the Perceived e-Readiness model [11, 27, and 28], the diffusion of innovation theory [9], theory of Planned Behavior, and the technology acceptance model, etc. Many researchers carried out discussions on the models and theories about their advantages and disadvantages [11, 28, and 29]. There is no comprehensive model for every study’s objectives. Unfortunately, all they are unsuitable with this study’s objectives.

Based on the directed objectives, we proposed an “interactionism” framework, so-called, the Government-Organization-Technology framework (GOT) (see Figure 1). There are three main theories used to develop the framework. The competitive context analysis (in [31]) provides a comprehensive and empirically supported framework for analyzing the role and importance of national factors that define the environment of its firms. In this, demand conditions, related and supporting industries, and government are some of the most important attributes. This helps firms to understand their national context and the primary environmental factors that are crucial in affecting their e-Commerce implementation. Based on this theory, authors proposed that the role of government should be assessed through four constructs: Government leadership, human resource management, IT infrastructure management, and legal and regulatory system. The theory of organizational innovativeness research (in [10]), which pursues to discover the determinants of an organization’s propensity to innovate, identifies important influential
organizational characteristics, such as centralization of decision-making, technological capabilities, organizational environment, slack resources, and external communication channels. Based on this theory, authors proposed that the role of organization should be assessed by four constructs: Available Resource, Decision-maker’s Perception, Internal Organizational Characteristics, and External Business Relationships. The theory of innovation diffusion research (in [10]) identifies characteristics of technology, which affect significantly innovation diffusion, including relative advantage, compatibility, complexity, observability, and tri-ability. Based on this theory, in our model the role of technology is determined through two constructs: Perceived Benefit and Perceived Challenges.

2.4. Innovation process in construction: a dynamic impact-role-factor approach

According to Tatum (1986, 1987a, 1987b) (in [10]), the general innovation process in construction can be divided into 6 steps: (1) Recognizing forces and opportunities for innovation; (2) Creating a climate for innovation; (3) Developing the necessary technological and entrepreneurial capabilities; (4) Providing new construction technologies; (5) Experimenting and refining; (6) Implementing on projects and in the firm. However, the process is often not simple or linear but iterative, having many feedback cycles; and when innovation is complex and/or originate within the organization the process tends to be more muddled and overlapping [10]. In addition, an enterprise collects their readiness along with the innovation process. So, the enterprise’s readiness collection process is dynamic; the readiness level is changed, increasingly or decreasingly, over time. If the readiness level meets the “required level” then an implementation decision is made, otherwise an implementation decision will be rejected. Under the dynamic approach, figure 2 proposed to illustrate the impact roles of government, organization, and technology in an enterprise’s e-procurement implementation process. These results are supported by [9, 28].

In summary, in our study the theoretical impact-role-factor assessment model was developed based on a Government-Organization-Technology framework; hypothesized relationships were proposed under a dynamic approach with considering the dynamic nature of an enterprise’s readiness collection process and the multiple imperative impact regime. Future studies should be carried out to empirically test the model.
3. Discussion and the model development

As mentioned above, the readiness level must be influenced by factors which arise from many different sources and there exist three main relevant actors that play dominant impact roles, including the role of government, the role of organization, and the role of technology. A literature review is carried out to identify impact role factors for the model. The below are discussions and hypothesized relationships.

3.1. Government aspect

Government will play a role as a driver or supporter to adoption of innovation by its policies, regulations, and supports [9].

3.1.1. Government leadership and a construction enterprise’s propensity toward e-procurement

MDBs has carried out research on e-government procurement (e-GP) systems over the world and stated that all governments that have successfully adopted e-government procurement have usually had significant government leadership with funding, resourcing, planning, management and implementation support to create an environment where procurement modernization and change can occur in a sustainable way [30]. This is a strong evidence to believe that government leadership would likely affect, significantly, to construction enterprises’ readiness level. 

H1: The government leadership has a significant influence on an enterprise’ propensity towards e-procurement.

The role of government in the government leadership construct can be measured through three indicators: a national vision to re-engineering (step 1), an effective and appropriate long-term strategic roadmap on e-procurement (step 1) and construction e-procurement related professional agencies (step 1)

3.1.2. Human resource management performance by government and a construction enterprise’s human resource

In countries that have successfully adopted e-GP, there have usually been significant efforts from government to make provision for the education and training of executives, managers and staff with procurement responsibilities [30]. The government lead agency has had been available to it the appropriate high level policy, legislative, technical and management expertise and knowledge required. The range of education and training programs may be provided via government agencies, private sector organizations and tertiary institutions [30]. Previous studies argued that lack of awareness of e-procurement as a barrier needed to be addressed and proposed some solutions in which the role of government is thought of very important. [14, 31, 32] suggested that to overcome the IT literacy gap between the large and small/medium enterprises, a series of IT information forums needs to be developed under a full support of senior management. Thus,


Measurement indicators, including a human-resource management agency (step 1, 6), a comprehensive human-resource development plan (step 1), the human-resource developing supportive policies (step 2, 3, 6), and effective discussion forums (step 1, 2, 3, 4, 6).

3.1.3. IT infrastructure management and a construction enterprise’s technological resource

IT infrastructure is an important issue for e-procurement [6, 30]. In developing countries, e-procurement adoption has been generally constrained by the quality, availability, and cost of accessing such infrastructure [29]; poor industry standards, poor cross-disciplinary communication [34], and especially lacking of the readiness of institutions to govern and regulate e-procurement [28]. Researchers proposed that developing countries need to put in place Government to Business (G2B) initiatives in its policies in order to maximize and encourage e-commerce initiatives among the private sector (in [9]) and should develop a well-defined and broadly generic framework which can play a catalytic role of bringing together major developers and sectors and networks to promote common methodologies, modeling and standards [30]. Implementation of e-procurement in public procurement activities is believed to influence significantly on an enterprise’s readiness level in general. Thus, 1. Henceforth, the term “step 1,
2, 3, 4, 5, 6” is put behind each measurement to imply preliminarily phases where the readiness level is influenced by the measurement (see section 2.4).

H3: The IT infrastructure management performance by government may affect significantly on a construction enterprise’s technological resource in implementing e-procurement.

Measurement indicators: an IT supportive center (step 3, 6), a comprehensive IT developing plans and policies (step 1, 6), and an effective e-government procurement system (step 1).

3.1.4. Legal and regulatory system and an enterprise’s propensity and business resource toward e-procurement

According to [30], a current well structured, managed, supported and documented current procurement process provides a good base for the transition to e-GP. Non-performance of existing paper-based bidding-procurement system (non-transparency, unfair, non-efficient, non-effective, no value-for-money, etc.) and social issues (corruption, bureaucracy, fraudulent…) speed up reforming public procurement [30] and encourage state and private enterprises toward e-procurement. Dale Neef (in [35], page 108) argued that adoption of e-procurement methods by government organizations will greatly bolster the uptake of e-procurement among companies in the economy, and will have a strong influence on the development and evolution of e-procurement tools and techniques. Thus,

H4: The legal and regulatory system’s performance may likely influence significantly on an enterprise’s propensity and business resource toward e-procurement.

Measurement indicators: the current procurement management performance (step 1), an effective construction e-procurement law (step 1), a legal supportive center (step 1, 6), and a mandatory regulation to implementing public e-procurement to state departments and enterprises (step 1).

3.2. Organization aspect

Businesses in developing countries are not familiar with dealing with non-cash payments, anonymous and electronic-based intra and inter-business relations, all of which are important in e-Commerce (in [28]). Lou’s research in [7] argued that organizational factors, which decide the success of IT implementation, mainly include people and process, the enabling working environment, and the IT infrastructure. Thus, success of the implementation depends on making changes and re-engineering process in the organizational structure, product characteristics and business culture of their enterprises to develop such practices [28]. Many researchers also pointed out that organizational structure, technical expertise, availability of financial resources, attitude towards risk, technological capabilities, management attitude towards technology may facilitate adoption of innovation (in [10]). For construction literature, the barriers that tend to inhibit the adoption of ICT are typically related to the competitive nature of the industry, the fragmented supply chain comprising mainly small organizations and the dispersion of expertise, especially the poor inter-operability between different computer applications and/or organizational management strategies [13]. Therefore, the role of organization is to make changes and a successful organizational re-engineering process. It should be determined through the decision-makers’ role, the available resources developing strategy, other internal organizational characteristics, and the external business relationships.

3.2.1. The decision-maker’s perception forward e-procurement and an enterprise’s e-procurement readiness level

Most, if not all, businesses in developing countries tend to have a highly centralized structure (in [28]). This suggests that the perception of the managers about their organization, innovation, and their environment is likely to be critical in adopting e-Commerce [28]. Many researchers (in [10]) also argued that managers’ attitude towards technology and risk may facilitate adoption of innovation. Management commitment, manager’s awareness, and top management support are important factors affect adoption of e-commerce [2, 6, 11, 33, and 36]. Therefore, decision-makers’ view on the technology will influence, significantly, on the level of funding allocated towards e-procurement implementation. Moreover, researches on e-procurement in CI found that unsuitability of products or services to the selected e-procurement solutions [2, 6, and 37] and resistances to change, such as conservative business practices, cyclical variations in workload, fragmented nature of the industry, business process, and cultural are strong barriers to construction enterprises in implementing e-procurement [2, 3, 5, 6, and 33]. Thus,

H5: The decision-maker’s attitude and perception toward e-procurement would influence, significantly, on their enterprise’s level of readiness in implementing e-procurement.
Measurement indicators include the vision and leadership (their perspective of e-procurement implementation as a long-term strategic or short-term operational decision) (step 1), a comprehensive support commitment (step 2, 6), the change management role (step 3, 4), and the selection of a suitable e-procurement solution (step 4, 5).

3.2.2. The enterprise’s resource developing strategies and its available capability in implementing e-procurement

A simple definition of resources is that resources are the tangible and intangible assets a firm uses to choose and implement its strategies [38]. Resource-oriented approaches (in [10]) argued that the performance of firms depends, strongly, on factors, so-called, resources or capabilities, located within the organization. Human resource refers to the availability of employees with adequate experience and exposure to ICT and others kills (such as marketing, business strategy) that are needed to adequately staff e-Commerce initiatives and projects [11]. Business resource covers a wide range of capabilities includes the openness of organizational communication; risk taking behavior, existing business relationships, and funding to finance e-Commerce projects [11]. Technological resource refers to the ICT base of an organization and assesses the extent of computerization, the flexibility of existing systems and experience with network based applications [11]. Knowledge and skills make a firm’s competitive advantage and help the firm can innovate to new products and processes, or improve existing ones more efficiently [39]. Lacking of resources makes SMEs to be reluctant to invest in innovation [3, 13]. Hence, a firm’s human, technological, and business resources need to be considered in making adoption and implementation decisions [28]. Thus,

H 6: A construction enterprise’s developing strategy of the available resources would affect significantly on its level of readiness in implementing e-procurement.

Measurement indicators include a technological resource developing strategy (step 2), a human resource developing strategy (step 2), and a business resource developing strategy (step 2).

3.2.3. Internal organizational characteristics and an enterprise’s propensity and resource toward e-procurement

Besides the available resources and decision-makers or top management’s attributes toward e-procurement, there are other factors from internal organizational characteristics, which are considered that may influence, significantly, on the enterprise’s re-engineering process as well as propensity toward e-procurement.

- Type of enterprise (clients, contractors, consultants, and suppliers)

Barriers to e-business adoption work differently according to organizational type and culture [6]. For suppliers, it is difficult to include non-standard goods, which are less suitable for sale on e-business systems [2, 6, and 37]. For contractors, system maintenance and running costs, issues relating to financial fraud, connection speeds from sites, the costs of infrastructure for temporary or short term projects, process and cultural change [2, 3, 5, 6, and 33]. For consultants, the protection of “intellectual property” has also become a major issue for consulting organizations [2, 6, and 34]. Thus, type of enterprise is likely an impact factor on the enterprise’s propensity toward e-procurement.

- Type of ownership (private or state)

According to [15] and other studies, a public firm’s adoption of e-procurement more likely resulted from a political issue rather than an issue of efficiency, whereas a private firm would adopt e-procurement since its economic issue. And political-structural factors slow down the adoption process [1].

- Organizational structure

Previous studies argued that the complex structure of a firm may deter the implementation of e-commerce systems, making it less flexible to new changes (e.g. [11]). Thus, an organizational structure re-engineering is likely very necessary for implementation of e-procurement.

- Organizational culture

In [40], Hofstede (1991) stated that culture is the set of values, beliefs, rules, and institutions held by a specific group of people. According to researchers used the theory of planned behavioral in studying innovation adoption (in [9]), behavioral issues would play a significant role in the adoption of e-commerce. [11, 41] also argued that, in developing countries (e.g. China) the cultural issue and individual relationship deeply influence on trust and information sharing. The socio-cultural tension inhibits the adoption and diffusion of e-Commerce. The cost-driven culture of the industry has a deep effect on the uptake of IT investments by individual organizations [13].

- Operational scope (domestic or international)

Pressures on time and quality in international projects, more likely, pull an enterprise toward e-procurement. Thus, H 7: A construction enterprise’s propensity and business resource toward implementing e-procurement would be affected significantly by the enterprise’s internal organizational characteristics.
Measurement indicators, including the type of enterprise (clients, contractors, consultants, and suppliers) (step 1, 4, 6); the type of ownership (private or state) (step 1, 6); organizational structure (step 4, 6); organizational culture (step 1, 4, 6); and operational scope (domestic or international) (step 1, 4, 6).

3.2.4. An enterprise’s external business relationship and its propensity and resource toward e-procurement

Utterback (1974) proposed that a firm’s potential for innovation is a function of its environment, including economical, social, and political factors (in [10]). External communication channels are an important characteristic needed to be considered (Rogers (1983) in [10], [39]). In addition, construction procurement activities are quite intensive, complex, and occur in all the different phases of any project [5, 37]. These characteristics can be seen as being barriers in implementing IT in general and simultaneously make pressure of the more effective interoperability demand between organizations and to pull enterprises toward IT applications [42]. Market and competitive demands have been identified as important contextual impact factors for the innovation process. The rate of adoption of new technology depends on the interactions between adopters. And imitation effects play an important role in the diffusion of innovation (in [10]). Thus, the level of e-procurement implementation in competitors and business partners will much likely influence the readiness level of an enterprise. Moreover, to participate and win in government projects, especially projects sponsored by World Bank (WB), ADB, etc., enterprises need to make much more effort to implementation of e-procurement in their firms. Thus, characteristics of an enterprise’s main projects, such as capital source, size of the projects, and scope of cooperation or collaboration in the projects would affect considerably the enterprise’s propensity toward e-procurement. Thus,

H 8: A construction enterprise’s level of readiness in implementing e-procurement would be likely affected significantly by the enterprise’s external business relationships.

Measurement indicators: the trend of cooperation and collaboration (step 1, 6), e-procurement implementation within competitors and partners (step 1, 6), and characteristics of the enterprise’s main projects (step 1, 6).

3.3. Technology aspect

Kimberley (1981) argued that benefits of innovation are insufficient to bring about innovation in firms: firms also need to be motivated to innovate; innovation should not be viewed in unreflective, positive terms [44]. For construction e-procurement literature, potential benefits or challenges of the technology were identified broadly and deeply (see Table 1). A previous research on construction organizations has found that perceived barriers, cost, the perceived benefits of e-bidding and security concerns are the factors influencing on willingness to participate in e-bidding. Following the behavioral theory, before making a specific decision, organizations distinguish rather sharply between meeting a target and not meeting it (in [10]) and thus these characteristics of the technology would likely affect the decision-makers in making an implementation decision. It can be said that the role of technology is to make the mechanisms of “technology push” (in [10]) which influence significantly on the decision-makers’ propensity towards e-procurement implementation. Thus,

H 9: E-procurement’s benefits and barriers would affect significantly on the decision-makers’ propensity towards e-procurement implementation.

Measurement indicators include competitive advantage (improved communication, enhanced number of suppliers, cost savings, time savings, and improving productivity) (step 1); help to improve managerial issues (step 1); help to enhance opportunities to public projects (step 1); security (step 1, 6); cost (step 1); non-released benefit/cost (step 1), suitability (step 1) and standard issues (step 1).

Finally, authors proposed two further hypotheses that:

H 10: The role of government has a stronger influence on a construction enterprise’s readiness level in implementing e-procurement than the role of the enterprise for self.

H 11: Technology plays a moderating role on the relationship between government management and a construction enterprise’s readiness level in implementing e-procurement.

In short, the theoretical impact-role-factor assessment model proposed includes ten impact-role constructs and eleven the hypothesized influential relationships.
4. Conclusions and further researches

In this study, a theoretical model was built to assist assessment the influences of government, organization, and technology on a construction enterprise’s e-procurement implementation readiness level in developing countries’ context. The model consists of ten constructs with eleven the hypothesized influential relationships. The role of government is measured through five factors, including the government leadership, the procurement related human-resource management, the IT infrastructure management, and the legal and regulatory system. The role of organization is measured through four factors, including the decision-makers’ perception on e-procurement, the resource developing strategies, the internal organizational characteristics and the external business relationships network. Technology plays an important role in making the mechanisms of “technology push” and is measured by its perceived benefits and barriers to the implementation.

To construct the model, authors posited a dynamic definition of an enterprise’s e-procurement implementation readiness. The readiness of an enterprise consists of the enterprise’s propensity forward e-procurement and its available capability in implementing e-procurement. The readiness level is changed over time in the innovation process. Barriers and challenges to e-procurement implementation in CI were identified. Analyzing the innovation adoption theories was carried out and a Government-Organization-Technology framework was proposed (the GOT framework, see Figure 1). Authors used the 6-steps innovation process in construction as a base to assess the role of related sides in construction procurement chain under a dynamic approach (see Figure 2).

The study’s results are hoped to contribute significantly on the e-procurement research literature in construction industry. Further researches need to be carried out to test empirically the model. Researches in order to assess the role of government, organization, and technology in developed country’s context should be also conducted. These studies’ results will help to make a comprehensive picture of impact-role factors on the construction e-procurement implementation.

5. Copyright

All authors must sign the Transfer of Copyright agreement before the article can be published. This transfer agreement enables Elsevier to protect the copyrighted material for the authors, but does not relinquish the authors' proprietary rights. The copyright transfer covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microfilm or any other reproductions of similar nature and translations. Authors are responsible for obtaining from the copyright holder permission to reproduce any figures for which copyright exists.

References

2. Arjan van Weele and Nicolette Lakemond, E-Procurement: Fact or Fiction? On the Application of E-Procurement Solutions. This article is based upon our paper presented during the IPSERA Conference 2003, Budapest, April 14th -16th.
6. Guillermo Aranda-Mena and Peter Stewart, Barriers to e-business in construction – International literature review. The research was carried out by the Australian Cooperative Research Centre for Construction Innovation, RMIT University.
30. MDBs (April 2007), Corruption and Technology in Public Procurement, This document were prepared for the Procurement Harmonization Project of the ABD, the inter-American Development Bank, and the WB.