

IMPLEMENTING E-PURCHASING IN CONSTRUCTION ORGANIZATIONS: AN EXPLORATORY STUDY TO IDENTIFY ORGANIZATIONAL CRITICAL SUCCESS FACTORS

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Abstract

Studies have shown that e-purchasing offers benefits in terms of time and cost saving, and increases business efficiency. In construction industry, the adoption and implementation of e-purchasing system offers many benefits such as reducing material cost and enhancing productivity. Although e-purchasing provides a wealth of new opportunities and ways of doing business, the implementation presents a series of challenges particularly in the construction industry. One of the challenges that has been identified was system adoption failure. Studies have reported that between 75-85% of all e-purchasing system failed to achieve the promised results. The high percentage of e-purchasing failure reported has led researchers to investigate the reasons particularly in area of critical success factors (CSFs). Unfortunately, little work has been done to investigate the CSFs on e-purchasing implementation, especially in the construction industry. This has contributed to the limited available list of CSFs in the context of organizational aspect. This paper is set out to fill the gap and to provide a framework of organizational CSFs in e-purchasing implementation in construction organization through an exploratory study. Based on the literature review, 26 factors were identified. Interviews were conducted using open-ended questionnaire with 10 experts from different background in the construction industry. Qualitative analyses were used to validate the existence of these factors. The result of the study will provide a framework for the development instrument for future empirical study.

Keywords: *E-Purchasing, Organizational CSF, Construction Industry, Construction Organizations.*

JEL Classification: M2

1. INTRODUCTION

In response to the growing global competition and myriad challenges, organizations have to enhance their business practices and processes through information and communication technology (ICT) of a supply chain application. ICT is believed to have a positive impact on performance of the supply chain in organizations. According to Wei and Chen (2008) and Turban et. al., (2008), utilization of a supply chain application is able to improve supply chain efficiency hence getting competitive advantage. Electronic purchasing (e-purchasing) is one of the supply chain management applications that use ICT. Studies have shown that e-purchasing saves millions of dollars in transaction, reduces the suppliers base, promotes paperless transaction and, increases transparency and accountability (Ariba, 2005; Watch, 2005). In the construction industry, Vaidya and Soar (2002) found that e-purchasing provides advantages that include simplification of purchasing processes, easiness in managing relationships with suppliers (Stephenson and Chia, 2006), cost saving (Eakin, 2003; BuyIT, 2002; Turban et al., 2004), improves information flow, communication, and collaboration (BuyIT, 2002; Local Government UK, 2004).

Few studies reported that, 75-85% of e-purchasing projects were failed to achieve the promised results (Clark, 2000; Hansen, 2006; ICG Commerce., 2009; Monk, 2000). This scenario has concerned many researchers to investigate the main cause of failure (Allen, 2003; Hansen, 2006; ICG Commerce, 2006). Study in identifying critical success factors (CSFs) is growing, unfortunately the literature is still lacking of investigation in e-purchasing CSF, particularly in construction organization. This leads to a limited framework in such area. In a relation to this matter, this on-going research is carried out to explore organizational CSFs of e-purchasing implementation based on the frameworks developed from the literature review.

2. LITERATURE REVIEW AND FRAMEWORK OF ORGANIZATIONAL CRITICAL SUCCESS FACTORS (CSFS)

CSFs has received much attention in the past decade (Chan and Swatman, 2000; Eid and Trueman, 2004; Li and Li, 2005; Angeles and Ravi, 2007). Generally, the CSFs can be defined as the critical areas which organization must accomplish to achieve its mission. An organization needs to understand the CSFs that are affecting business processes to ensure business efficiency in the B2B environment (Chong et al., 2011). The review of literature suggested numerous CSFs that contribute to a successful implementation of information systems (IS).

An organizational factor is one of the critical factors that influences information system (IS) success implementation (Aguita-Obra and Padilla-Melendez, 2006; Allen, 2003; Ang

et al., 2001; Hussien et al., 2007; Serour and Sellers, 2004; Tallon et al., 2000). The organizational factor emphasizes on individual characteristics, and organization internal and external characteristic (Oliveria and Martins, 2011) and required special attention (Ghiya and Powers, 2005). These factors, however, need to be adjusted or changed to suit its changing environment (Teo et al.,1997; Vadapalli and Ramamurthy, 1997). Twenty-six (26) CSFs were identified from a comprehensive literature review, as shown in Table 1.

Table 1: List of Organizational CFSs in the literature

Item	CSFs	Author(s)
1	Organization policy and strategy plan	Vaidya et al.(2006), Linus et al.(2010), Esichaikul and Chavananon (2001), Kuzic and Kuzic (2004), Maheshwari (2002), Giunipero and Sawchuk (2000), Behkamal et al.(2007), Alwabel and Zairi (2005), Khan et al.(2010), Li and Huang (2004), Price Water Coopers (2001)
2	Plan and Schedule	Jennex et al.(2004), Gunasekaran and Ngai (2008), Li and Huang (2004)
3	Steering committee and project team	Kao and Durocher (2007), Li and Huang (2004)
4	Appropriate business model	Esichaikul and Chavananon (2001), Sehwill and Ingalls (2005), Laosethakul(2005)
5	Top management support	Bouchbout and Alimazighi (2009), Vaidya et al.(2006), Gunasekaran and Ngai (2008), Linus et al.(2010),Kuzic & Kuzic (2004), Robertson (2005), Jamil and Ahmad (2009), Chad et al.(2010), Luvsanbyamba and Chung (2009), Alwabel and Zairi (2005), Li and Huang (2004), Chan et al.(2006), Aberdeen Group (2005a), Maheshwari (2002), Laosethakuln (2005), Cata (2003), Yu-Hui (2008)
6	Effective and knowledgeable project manager	Kuzic and Kuzic (2004), Li and Huang (2004), Maheshwari

		(2002)
7	Stakeholder involvement	Chad et al.(2010)
8	Defines roles and responsibility of team members	Li and Huang (2004), Maheshwari (2002)
9	Experience with new technology	Robertson (2005), Alwabel & Zairi (2005), Khan et al.(2010)
10	Organizational commitment	Chan and Swatman (1999), Kao and Durocher (2007), Chad et al.(2010)
11	Appropriate organizational structure	Jennex et al.(2004), Kuzic and Kuzic (2004), Alwabel and Zairi (2005), Giunipero and Sawchuk (2000), Price Water Coopers (2001)
12	Change management	Vaidya et al.(2006), Li and Huang (2004), Chan et al.(2006), Aberdeen Group (2005a), Price Water Coopers (2001)
13	Close collaboration with trading partners	Gunasekaran and Ngai (2008), Maheshwari (2002)
14	Relationship building with trading partners	Robertson (2005), Kao and Durocher (2007), Laosethakul (2005)
15	Promotion of systems through communication within organization	Jamil and Ahmad (2009), Turban et al.(2004)
16	Organizational culture	Kao and Durocher (2007), Chad et al.,(2010),Alwabel and Zairi (2005), Maheshwari (2002), Giunipero & Sawchuk (2000)
17	Reengineer business process	Jennex et al.(2004), Rebecca and Ravi (2007), Rebecca and Ravinder (2005), Vaidya et al., (2006), Gunasekaran and Ngai (2008), Linus et al.,(2010), Kao and Durocher (2007), Li and Huang (2004), Chan et al.,(2006), Aberdeen Group (2005a), Cata (2003)
18	Training and education program	Behkamal et al.(2007), Chan and Swatman (1999), Esichaikul and Chavananon (2001), Vaidya et al.(2006), Gunasekaran and Ngai (2008), Linus et al.(2010), Kao and Durocher (2007), Li and Huang (2004), Chan et al.,(2006),

		Giunipero and Sawchuk (2000), Price Water Coopers (2001)
19	Good quality of employee/staff	Li and Huang (2004), Laoethakul (2005), Giunipero and Sawchuk (2000)
20	Adequate financial resources	Bouchbout and Alimazighi (2009), Kuzic and Kuzic (2004), Kao and Durocher (2007), Alwabel and Zairi (2005), Lin et al.(2010), Li and Huang (2004)
21	Performance measurement	Vaidya et al.(2006), Linus et al.(2010), Kuzic and Kuzic (2004), Alwabel and Zairi (2005), Aberdeen Group (2005a), Laoethakul (2005), Giunipero and Sawchuk (2000)
22	Regularly monitoring and evaluation of performance	Li and Huang (2004)
23	Readiness of trading partners	Behkamal et al.(2007), Esichaikul and Chavananon (2001), Bouchbout and Alimazighi (2009), Rebecca and Ravinder (2005), Li and Huang (2004), Vaidya et al.,(2006)
24	Trust with trading partners	Behkamal et al.(2007), Jennex et al.(2004), Luvsanbyamba & Chung (2009), Laoethakul (2005)
25	Communication with trading partners	Gunasekaran and Ngai (2008), Linus et al.(2010), Giunipero and Sawchuk (2000)
26	Vendor support	Chad et al.(2010), Rahim (2008)

Based on the abovementioned CSFs, an initial framework of organizational CSFs of e-purchasing implementation success is developed as shown in Figure 1. This framework becomes a foundation to this research in identifying the organizational CSFs for e-purchasing implementation success in construction organization.

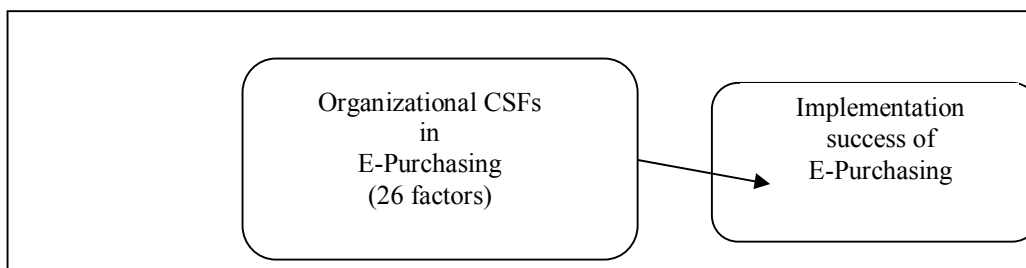


Figure 1: Initial Framework for the Organizational CSFs of E-Purchasing Implementation Success

3. RESEARCH METHODOLOGY

This study involves two-stage processes. It begins with an identification of the CSFs derived from literature review. The findings were further enhanced through a series of face-to-face interviews with construction industry experts, which were conducted between August 2011 to December 2012. Thirty-two (32) publications were reviewed; ranging from 1999 to 2011 which include peer review, journals, and theses. This approach stimulates and provides theoretical understanding of phenomenon under study.

Following that, ten (10) industry experts were interviewed in order to validate the identified organizational CSFs from the construction industry perspectives. In this study, theoretical saturation was established at the tenth interview. The selection of interviewees was based on purposive sampling where all interviewees have specific experience with e-procurement, criteria, and knowledge of phenomenon under study (Cavana et al., 2001; Cooper, 2008; Creswell, 2009). The interviewees have had 17 years experience in industry practices, in average, with at least 5 years experience in managing e-procurement projects. The job titles of the interviewees are ranging from academician, construction client (owners), procurement manager, IT manager, contract manager, and business solution manager. The contents analysis was done manually, where the researchers went through the whole text to make a sense out of the scripts.

4. RESULT AND DISCUSSION

Findings from a content analysis of interviews revealed that fourteen (14) important success factors in the implementation of e-purchasing in the construction organizations. Thus, the initial framework developed (as shown in Figure 1) is modified to suit with the construction industry perspective. Figure 2 shows a new framework for organizational CSFs of e-purchasing implementation success in construction organization. One factor was discovered namely 'user adoption'.

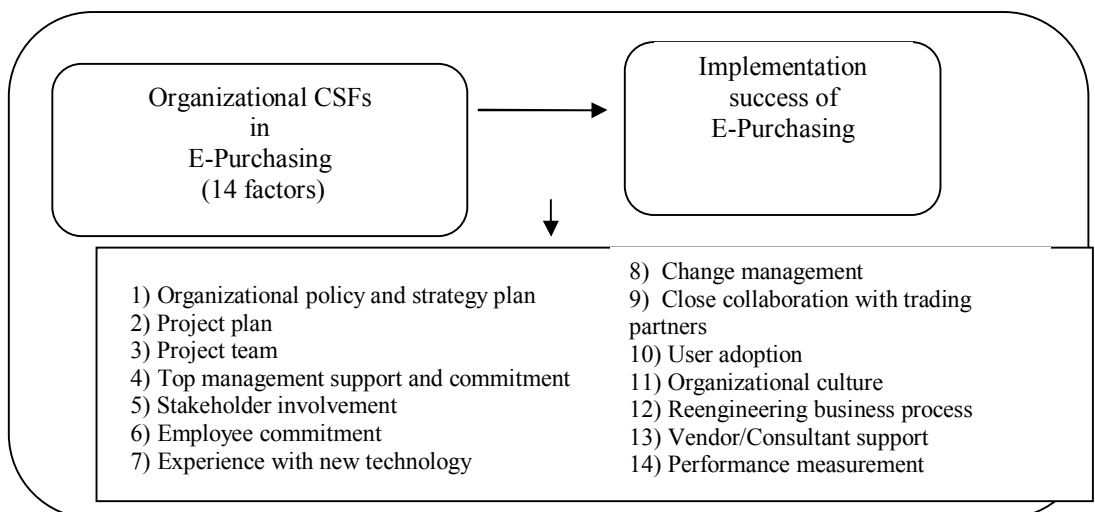


Figure 2: Modified Framework for the Organizational CSFs of E-Purchasing Implementation Success

The followings are CSFs that are consistent with the literature, which contribute to the successful implementation of e-purchasing:

4.1 Organizational policy and strategy plan

The creation of policy and strategy plan prior to the development of e-purchasing solution is an important CSFs (Neef, 2001) and the success of business-to-business (B2B) initiative starts from its policy and strategy plan (Porter, 2001). Organizational policy and strategy plan is the establishment of a framework and strategizing the accomplishment of the stakeholders' interest and project objectives into an end-result (Lewis, 2001). The strategy sets the boundaries and future direction of the project implementation (Longman & Mullins, 2004). It is the center of any B2B initiatives (Maheshwari, 2002). Findings from interviews show that policy and strategy plan provides rules, direction and guidance to the project implementation and this finding is consistent with the literature.

4.2 Project plan

The organization needs a well-defined project plan and schedule for managing activities involved in implementing B2B initiative (Li and Huang, 2004). A project plan must satisfy the criteria of objectives, tasks, resources, responsibility, schedule and deliverables (Thornton & Marche, 2003). The findings prove that the implementation of e-purchases requires a proper project planning and scheduling because it involves money and time.

4.3 Project team

A project team is responsible for creating the detail project plan, assigning responsibilities, and determining timeframe for the entire project (Lin et al., 2003). It includes business and technical people (Li and Huang, 2004). Moreover, the organization must ensure that the key persons represents the units in organization (Li and Huang, 2004). Findings indicate that the project teams perform the duties of a project management and they need to have strong domain knowledge to ensure effective project.

4.4 Top management support and commitment

Top management support and commitment provide leadership, resources, strategy, promoting the system implementation to employees (Bhatti, 2005), and encouragement for employees to participate (Hedman, 2010). Top management support and commitment are critical to the success of the IT investment in B2B transaction (Lin and Huang, 2007; Lin et al., 2007). Results indicate that the top management gives fullest support and commitment in terms of direction, guidance, time, resources, leadership, training and promotion of the system to entire organization.

4.5 Stakeholder involvement

Literature found a direct relationship between stakeholder involvement and success of any IT system implementation (Davindson, 2002; Lin and Shoa, 2000). The success in implementing of e-purchasing requires both stakeholder involvement and understanding (Aberdeen Group., 2005b; Audit Commision., 2006). They provides insights for the needs and requirements in business processes (Russell et al., 2004). Results from interviews indicate that stakeholder's role is to provide information and set requirements for the system. Therefore their roles and interest influence the e-purchasing implementation processes.

4.6 Employee commitment

In many IT implementation, employees commitment is a major success factor (Chan and Swatman, 1999). This commitment is in the form of performing work in a good quality output (Stup, 2006), loyalty to organization (Stup, 2006), positive attitude towards implementation process (Cata, 2003), and employee cooperation (Silverthorne, 2004). Results from interviews indicate that commitment of employee toward the B2B initiative implementation is important to support the implementation progress.

4.7 Experience with new technology

In today business environment, technology changes rapidly. It requires people to be up-to-date in experiencing business application technology (Kinder, 2000). Experience in the application of technology ensures successful implementation (Ageshin, 2001) by encouraging new knowledge acquirement, and making the organizations more competitive (Khan et al., 2010) and ease the system operation (Allen et al.,2002). Results from interviews indicate that this factor is consistent with the literature and contribute to successful implementation of e-purchasing.

4.8 Change management

Change management is an organizational process that is aimed to help employees to accept and embrace changes in their current business environment (Hiatt and Creasey, 2003). Change management is required to support changes in business processes (Vaidya et al.,2006). According to World Bank (2003) lack of change management in an organization can lead to project failure. Thus, it is suggested for the organization to develop and execute change management strategy to fully adapt the e-purchasing system (Walker and Rowlinson, 2007). Results from interviews show that change management is required because the new system need to be continuously updated to cope with the current initiatives.

4.9 Close collaboration with trading partners

Collaboration is defined as a process of decision making among independent organizations involving joint ownership of decisions and collective responsibility for outcomes (Gray, 1991). Collaboration emphasizes clear partnership between the trading

partners (Eid et al.,2002). By close collaboration with trading partners, business relationship could yield greater benefits (Business Link., 2007), improve business performance (SAP, 2007), and fasten decision making (Business Link., 2007; SAP, 2007). For the successful implementation of B2B applications such as e-purchase, a vital ingredient is to generate collaboration among trading partners (McNichols and Brennan, 2008). Interviews findings found that this factor requires a long term relationship, joint ownership in decision-making, trust and trading partner readiness.

4.10 User adoption

The important of user adoption for successful implementation of B2B initiatives has widely cited (Zahay and Hardfield, 2004; Brandon-Jones and Croom, 2005; Malta, 2010). Technology itself does not ensure successful adoption, it also depends on user making use of the new process and system (Vaidya et al., 2006). Users can only realize the benefits of the e-purchasing system once they understand the operational functionalities (CGEC, 2002). Therefore, training and skill development of e-purchasing tools usage is needed (World Bank, 2003) (ECOM Group, 2002). Results from interviews indicate that implementation of e-purchasing requires users to fully adopt to the system to increase effectiveness.

4.11 Organizational culture

Organizational culture is described as characteristics way and values through which work is done in organizations (Saltzman & Luthans, 2001). Characteristics and values involve empowerment, sharing of information, knowledge and organizational values; resulting in a competitive advantage for organizations (Saltzman & Luthans, 2001). Organizational culture allows willingness to accept new technology innovation (Nah, Lau, & Kuang, 2001). In addition, implementation of new technology innovation such as e-purchasing needs open communication and information sharing that can promote a common culture and innovative behaviour in the organization (Motwani et al., 2005). Many scholars have showed that the organizational culture factors had a significant impact on the success of the B2B implementation (Eid et al.,2002; Nah et al., 2001; Saltzman & Luthans, 2001). Findings show that the implementation of the new system requires the organizational culture changes. A new organization culture brings positive change, promotes learning, sharing knowledge and information, and promotes innovation as a part of improvements to business processes.

4.12 Reengineering business process

Reengineering business process is a radical redesign of the organization's current culture, structure, and process (Lin et al.,2003). Organizations need to reengineer the business processes as they influence the behavior of employees to follow new systems and enforce new procedures in which the organization intends to implement (Angeles and Ravi, 2007). The process looks into rationalizing the flow of transactions and information between trading partners (Angeles and Ravi, 2007). The roles and responsibilities may change significantly with new process (Birks et al.2001). Results from interviews showed

that reengineering business process is important to meet the needs of computerized processes and organizations. A business process change simplifies the process and eliminates redundant activities.

4.13 Vendor/Consultant support

An organization is encouraged to get advice from vendors (Lin et al., 2003) as they play an important role in the successful implementation of B2B initiatives such as e-purchasing (Chad et al., 2010). The supports provided by vendors include; i) provide qualified consultants knowledge to ensure the system adopted has robust and reliable (Lin et al., 2003; Rahim, 2008); ii) participation in implementation process (Lin et al., 2003); iii) fullest cooperation with customer in customized training of employee (Rahim, 2008); and iv) technical and emergency maintenance (Lin et al., 2003; Rahim, 2008). Results from interviews indicate that the vendor provides the system and infrastructure. The system capability is based on their understanding and experiences to meet organization requirements.

4.14 Performance measurement

Performance is defined as a degree to which an operation fulfils the underlined performance objectives (Slack et al., 2001) and some predetermined goals (Wickramasinghe and Gunawardene, 2010). Establishing performance measurement is very important in IT system implementation (Vaidya et al., 2006). There are many methods to measure a performance such as performance in organizational aspect, business , operating performance, financial, non-financial and quality performance (Salaheldin, 2008). In the process of performance measurement, the progress IT projects should be actively monitored through a set of milestone and targets (Al-Mashari & Al-Mudimigh, 2003; Nah et al., 2001) until the implementation of IT projects completed (Nah et al., 2001). Results from interviews indicate that performance measurement is used to check and see whether the implementation process meets the objectives or not, and this may be achieved through monitoring and evaluating the implementation process at a specific frequency to ensure that projects are completed within time and objectives.

5. CONCLUSION AND RECOMMENDATIONS FOR FUTURE STUDY

There were twenty-six (26) organizational CSFs have been identified in the literatures as indicate in Table 1 that influence the e-purchasing implementation success across industries. Nevertheless, results from the exploratory study reveals that only fourteen factors exist and specific to construction organization as indicated in Figure 2. The findings provide a new framework for studies of construction organizational CSFs.

The next stage of this study is to develop a questionnaire instrument based on fourteen (14) factors developed in this study and will be tested through the assessment of content validity in the pilot study. Large-scale study will be done by distributing questionnaires

to a target sample of a large construction organization population in Malaysia. Findings are expected to provide a better generalized of the issues in the implementation of e-purchasing in construction organizations. More importantly, the management will be able to make critical decisions and allocate resources needed to ensure the successful implementation of e-purchasing.

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