

## E-PURCHASING IMPLEMENTATION SUCCESS (e-PIS) FRAMEWORK IN CONSTRUCTION ORGANIZATIONS: AN EMPIRICAL ANALYSIS

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### Abstract

Studies have shown that e-purchasing saves millions of dollars in transaction, reduces the supplier base, promotes paperless transaction and, increases transparency and accountability. However, a few studies have reported that between 75-85% of e-purchasing projects have failed to achieve the promised results. Currently, studies undertaken to identify critical success factors (CSFs) of e-purchasing implementation in various industries is growing. Unfortunately, little headway is made in the direction of the construction industry, leading to lack of understanding and limited research framework. The aims of this paper are to establish a framework of organizational CSFs for e-Purchasing implementation and examine their relationship towards the successful implementation. The study adopts the survey questionnaire approach to collect empirical data. The questionnaire was distributed to the selected construction organizations which adopted an e-Purchasing using purposive sampling method and a total of 123 responses were used for analysis. The results from principle component factor analysis and correlation analysis provide 8 components of organizational CSFs comprises of 52 CSFs item which shows statistical relationship with e-Purchasing implementation success in dimension of project management success and user satisfaction. The result of the study provide a new framework for studies of construction organizational CSFs in e-Purchasing implementation in Malaysian construction organizations context.

**Keywords:** e-Purchasing, organizational CSF, construction industry, construction organizations, empirical study.

### Introduction

In response to growing global competition and the myriad of challenges, organizations have increasingly turned to the use of information and communication technology (ICT) in their supply chain as a means of enhancing their business practices and processes. As shown by various researches, ICT has a positive impact on the performance of the supply chains of organizations. According to Wei and Chen (2008) and Turban et. al., (2008), utilization of an ICT-based supply chain application is capable of improving supply chain efficiency, hence delivering a competitive advantage. Electronic purchasing, or 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 supplier base, promotes paperless transaction and, increases transparency and accountability (Ariba, 2005; Ramboll, 2005). An e-purchasing is refers to as the process of creating and approving purchase requisitions; placing and creating purchase orders; and receiving goods by a software system based on internet technology (Boer, Harink, & Heijboer, 2001). 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; Leong, 2011; Turban et al., 2004), standardized purchasing process across the organizations and real time market feedback (Leong, 2011), and improving information flow, communication, and collaboration (BuyIT, 2002; Local Government UK, 2004).

A few studies have reported that between 75-85% of e-purchasing projects have failed to achieve the promised results (Clark, 2000; Hansen, 2006; ICG Commerce., 2009; Monk, 2000). This disastrous result has prompted many researchers to investigate the main causes of failure (Allen, 2003; Hansen, 2006; ICG Commerce, 2006). Mukherjee (2003) has suggest managers to evaluate their project carefully and understand clearly the factors that lead to success of enterprise systems project. Al-Omouh (2008) point-out that the organization need to identify and understand the critical success factors to ensure that the promised benefits of the supply chain management systems can be realized and failures can be avoided. Mose, Muranga, and Magutu (2013) has point-out that for any e-procurement initiative to be successful, there are a number of factors that an organization must critically consider. Based on these statements it highlights an important to investigate the critical

success factors for successful implementation of an enterprise IT systems. The current study concentrates on the study of critical success factors for successful implementation of e-Purchasing systems which are expected to solve the failure rate problem during implementation of the systems in an organization and to ensure the enterprise systems projects more successful implemented.

Currently, studies undertaken to identify critical success factors (CSFs) of e-purchasing implementation in various industries is growing. Unfortunately, little headway is made in the direction of the construction industry, leading to lack of understanding and limited research framework. It is in pursuant of a much better understanding of the CSFs for the construction industry that this research was carried out, and to accomplish this, an empirical analysis was made to establish a framework of organizational CSFs and their relationship to e-Purchasing implementation success.

### **Overview of organizational Critical Success Factors (CSFs) for e-Purchasing**

Critical Success Factors (CSFs) approach is used in this study. This approach was first developed by Rockart (1979). CSFs can be defined as “areas, in which results, if they are satisfactory, will ensure successful competitive performance for the organisation” (Rockart, 1979; Rockart, 1986). Many researchers e.g. Gajendran, Brewer, and Chen (2003); Jijian-Li and Liwei-Li (2005); Robertson (2005); Clark, Kennedy, Schmitt, and Walters (2012); Rebecca and Ravi (2007); Almotairi (2008); Pabedinskaite (2010); Mose, Muranga, and Magutu (2013); Sangar and Lahad (2013) have used this method as a means to improve the performance of the supply chain management systems process. Organizational CSFs is a part of CSF concept that need to be well managed (Aggestam & Soderstrom, 2006) and become the focus of this paper. This factor effect the overall of the success and become challenges of e-Purchasing implementation (Walker & Harland, 2008). The organizational factors is one of the factors that influence the success of any IS implementation in organizations (Ang et al., 2001; Tallon et al., 2000; King and Sabherwal, 1992; Grover, 1993; Miller, 2001; Hussien et al., 2001). This factors affect the overall success and become challenges of e-Purchasing implementation (Walker & Harland, 2008) and it must be given due attention if the organization wants to gain competitive advantage on the current undertaken initiatives. In this paper, organizational CSFs are viewed as those organizational activities and practices that should be addressed in order to ensure the success of e-Purchasing implementation.

### **Methodology**

The questionnaire which was developed for this study was based on two dimension of e-Purchasing implementation success and the scaled used was a 5 Level Likert Scale. To ensure data validity and reliability of the survey instrument, qualitative content validation assessment (CVA) was conducted with 5 academicians with status of Associate Professor and Professor from public and private universities. The selection of these expert was based on expert sampling as frequently recommended by prior researcher (Haynes, Richard, & Kubany, 1995). The alteration to the questionnaire was done based on the feedback from the CVA expert due to vague, unclear question category, the answer options and unclear purpose question. An expert comment also helped us improve its quality. A pilot test was conducted to verify the various dimensions of the questionnaire. Thirty (30) respondents from the sampling frame participated in the pilot study before the actual main data collection commences.

#### **a. Sampling and Data Collection**

The target population of this study were Class G7 construction companies, which was the highest class of contractors registered with Malaysian Construction Industry Development Board (CIDB). This study employs purposive sampling which was one the non-probability sampling as an appropriate method to represent the population of the organization for better generalization to be made and conclusion to be drawn. Based on companies registered under G7 with CIDB until 31<sup>st</sup> July 2012, 4,413 companies were registered and only 2,181 contractors were registered as civil engineering contractors. An investigation was made on a thousand (1000) contractor companies' profiles out of the total population (2,181). Of this number in turn, only one hundred and twenty-four (124) contractor companies meet the purposive sampling selection criteria and were subsequently selected as sample. The sampling criteria set were; i) size of companies, ii) establish companies have received prestigious management awards from recognized institution such as Small and Medium Industries Association of Malaysia (SMI) and CIDB for award of MCI Excellence Awards, G7 Contractor Award and Special Award for Innovation, and iii) consistency of project on-hand (3 years continuously and upwards). The survey was administered to 264 senior managers from the IT department, Contract

department and Procurement/ Purchasing departments of the G7 contractors listed organizations. Summary of sample design for this study is summarized in Table 1.

Table 1: Sample Design of Research

Items	Sample design	Description
1	Unit analysis	Individual
2	Target sample companies (based on purposive sampling)	W.P, Putrajaya (2) Kuala Lumpur (41) Selangor (67) Johor (3) Perak (1) Pulau Pinang (2) Kedah (1) Pahang (1) Melaka (1) Sarawak (2) 124
3	Sampling frame	Organization Department/Unit that comprises of; -IT department/unit -Contract department -Purchasing department/unit
4	Individual	-IT Manager -Contract Manager -Purchasing Manager
5	Total population (specific to G7 contractors on civil engineering works)	2,181 (registered with Pusat Khidmat Kontraktor until 15 <sup>th</sup> November 2011)
6	Respondents	264

Primary quantitative data collection was done via survey questionnaire. There were 127 responses received, only 4 of the questionnaires were unusable indicating an estimated response rate of 46.59 per cent exceeds the normal range of 20%-30% for construction industry research (Akintoye, 2000; Hoonakker, Carayon, & Loushine, 2010; Karim, Marosszeky, & Kumaraswamy, 2005; Quazi, Chang, & Chan, 2002; Stanley & Sattineni, 2012). Summary of data collection for this study is summarized in Table 2.

Table 2: Summary of data collection

Item	Description of Method		Percentage (%)
1	Targeted number of organizations participating	124	
2	Actual number of organizations participated	81	65.32
3	Total number of questionnaires distributed		
	i) E-mail	144	54.55
	ii) Postage mailed	111	42.05
	iii) By hand	9	3.40
		264	
4	Total number of questionnaires returned		
	i) E-mail	66	51.97
	ii) Postage mailed	17	13.39
	iii) On-line survey	29	22.83
	iv) By phone communication	7	5.51
	v) By hand	8	6.30
		127	100.00
5	Number of questionnaires unusable	4	3.15
6	Number of questionnaires examined for this study (valid questionnaire)	123	96.85
7	Response rate	123/264 = 0.4659	46.59

## b. Follow-up Reminders

Follow-ups with the targeted respondents on their participation in the questionnaire survey were made through telephone calls and electronic mails (e-mail). This was to ensure that i) a high response rate was attained, ii) the respondents were reminded of the time limit and, iii) the importance of this study and the respondents' responses was re-emphasized. This was done through a monitoring and tracking schedule purposely set-up to ensure systematic follow-ups.

### c. Indicator of the Organizational CSFs Construct

Fifty-eight (58) indicators were identified and extracted through literatures to measure the organizational CSFs. They are measured from a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

### d. Indicator for E-Purchasing Implementation Success Construct.

Two (2) indicators were used to measure the dependent variable, which is e-Purchasing system implementation success. They are project management success and user satisfaction.

Project management success was adopted and adapted from previous research by Chung (2007), Lind and Culler (2009), and Rosacker (2005). To measure this construct, the Likert scales of 1 (strongly disagree); 2 (disagree); 3 (neutral); 4 (agree) and, 5 (strongly agree), as suggested by Rosacker (2005), were used.

As for user satisfaction indicator, it was adopted and adapted from the research by Chung (2007), Mohamad, Hussin, and Hussein (2009), and Dezdard and Ainin (2011). The construct was measured using the Likert scales of 1 (strongly disagree); 2 (disagree); 3 (neutral); 4 (agree) and, 5 (strongly agree), which is a modification of those used by Mohamad et al. (2009), and Dezdard and Ainin (2011). Table 3 shows a summary of variables and the number of indicators in respect of each construct.

## Data analysis and key findings

An analysis of the returned questionnaires was conducted using an SPSS version 20 computer package. Two types of analysis were conducted to achieve objectives of this paper. First is principle component factors analysis (PCFA) which shows the dimensional composition of the instrument that fits the organizational CSFs of e-Purchasing framework. Second is correlation analysis which shows relationship between the organizational CSFs of e-Purchasing and e-Purchasing implementation success.

**a. Principle Component Factor Analysis (PCFA):** In this study, PCFA was first applied to determine the underlying structure of the CSFs for e-Purchasing implementation. The purpose of using PCFA in this study were to identify the new, meaningful underlying structure of the CSFs for e-Purchasing implementation and to reduce the dimensionality of the CSFs set as a prelude to further analysis of the data. Factors are formed by grouping the items that have a correlation with each other. There are mainly five stages in analysis.

**b. Initial solution:** Before conducting PCFA two tests were performed to check the possible presence of multicollinearity or correlation among the CSFs: the Kasier-Meyer-Olkin (KMO) measure for measuring sampling adequacy (Field, 2005), and the Bartlett Test of Sphericity for testing the presence of correlation (Hair, Black, & Babin, 2009). Meyer-Olkin (KMO) and Bartlett's tests of sphericity (BTS) are then applied to the studied variables in order to validate if the remaining items are factorable. The KMO value should be greater than 0.5 for a satisfactory factor analysis (Hu, 2012). BTS, on the other hand, should show that the correlation matrix is not an identity matrix by giving a significance value smaller than 0.001 (Ho, 2006). The overall KMO was 0.874, which was greater than the minimum value of 0.5. For two dependent variables, on the other hand, the KMO was 0.856 and 0.786, which also was greater than the minimum value of 0.5. The BTS was found to be range between 125.34 to 927.97, with significance at 0.000 level for independents variables. For two dependent variables, on the other hand, the BTS was 330.98 and 332.73, with significance at 0.000 level. This means the correlation matrix was not an identity matrix. Field (2005) highlighted multicollinearity exists when a correlation coefficient values,  $r$  is greater than 0.8 and determinant value is less than 0.0001. Result shows that multicollinearity was not presence which there is no item is higher than 0.9 and determinant value is greater than 0.0001, therefore no item was removed in this stage and all items was suggested to use in factor analysis. The results of both tests supported the use of PCFA for the 58 organizational CSFs.

**c. Extracting the factors:** An appropriate number of components (factors) is extracted from the correlation matrix based on the initial solution. In the initial solution, the Total Variance Table that shows the actual components extracted was referred. The cut-off criterion was the eigenvalue of the factor should be greater than or equal to 1.0 (Field, 2009; Morgan, Leech, Gloeckner, & Barret, 2004; Pallant, 2007) and the cumulative proportion of variance explained is more than 70% (Lehman,

O'Rourke, Hatcher, & Stepanski, 2005; Suhr, 2005), if it is to be extracted. Thus, based on this two criterion, the number of components to be extracted was 8 components comprises 58 organizational CSFs. This 8 components have fulfil the criterion set which the eigenvalues is 1.462 (more than 1.0) and cumulative proportion of variance is 72.01 %.

**d. Rotating the factors:** Sometimes one or more item variables may load about the same on more than one component, making the interpretation of the factors ambiguous. Thus, factors are rotated in order to clarify the relationship between the item variables and the factors (Piaw, 2009; Tabachnick & Fidell, 2007). While various methods can be used for factor rotation, an oblique rotation method is used in this study which follows the suggestion by Pallant (2007) and Fabrigar (1999) which was suitable method for the components matrix have correlated above 0.30 or correlation between item variables was expected. Besides, a direct oblimin rotation can increase interpretability of datasets Salt (2002) and produce a better simple structure Conway (2003). In this method an analysis of the Eight-Factor Solution with Direct Oblimin Rotation was used where an output was generate factor loadings. The higher factor loadings indicates the most important components (Tabachnick & Fidel, 2007) which was suggested cut-off value as 0.4 by Maccallum, Widaman, Zhang, and Hong (1999); Field (2009); Morgan et al. (2004); Steven (1995) and Nunnally (1978). Moreover, cross loading shows in the Pattern Matrix table shall be removed or deleted from the analysis (Bose, 2009; King & Teo, 1996; Lavagnon, Amadou, & Denis, 2012; Piaw, 2009; Teo, Ranganathan & Dhaliwal, 2006) as it become interpretation of the output difficult (Sheridan & Ong, 2011). Thus, based on this criterion, the number of components to be extracted was 8 components comprises of 54 organizational CSFs item for e-Purchasing implementation success which shows that "offer reward system to encourage ideas and innovation", "appropriate training sessions", "promote the implementation of the e-Purchasing systems" and "decide appropriate e-Purchasing business model" were deleted and not appear in the final components.

**e. Naming the factors:** Results are then derived by analysing the factor load of each variable. An appropriate names are given to each factor by considering the factor loads (Emin, Emel, Ercan, & Gamze, 2007; Sadegh, Khalil, & Ali, 2012) and being subjectively inferred from the nature of the grouped items. By applying factor analysis this study was able to provide a structure framework of 8 components organizational factor which consists of 54 CSFs item for e-Purchasing implementation success.

**f. Validating Framework:** The structure framework of organizational CSFs for e-purchasing were then be validate by testing with homogeneity and reliability analysis to determined internal consistency of the factors. The values of Cronbach's alpha for all of the eight dimensions of the organizational CSFs for the implementation of e-Purchasing were excellence value which between 0.900 – 0.935 , greater than 0.60 as suggested by George and Mallery (2003) The mean inter-item correlation value for this dataset was shows higher than threshold of 0.45 but not exceed the value of 0.9 as recommended by Kleefstra, Kool, Zandbelt, and Haes (2012). The result shows that the homogeneity and reliability was higher than cut-off recommended and were deemed to indicate as a good reliability of factors (Clark & Watson, 1995). Thus, the results of homogeneity and reliability analysis for this study provide evidence that all the factors in the framework of organizational CSFs for e-purchasing have a high internal consistency and reliability.

For discriminant validity it was been checked through the factor analysis output. Discriminant validity was confirmed when items for each factors loaded onto single component with factor loading value greater than 0.4 (Huynh & Lin, 2013; Nunnally, 1978) which indicates that discriminant validity was satisfied. Based on this reliability and validity test this study considers that this organizational CSFs framework for e-Purchasing was preliminary achieving best of fit of data set.

The final components of the organizational CSFs of e-Purchasing contain of 8 components which be name as grouping factors comprises of 54 CSFs items. This framework was statistical validate and shows high internal consistency and satisfied validity through homogeneity, reliability and discriminant validity. The summary of the framework was indicate in Table 3 below.

Table 3: Result of Principle Component Factor Analysis (PCFA)

Component	Cronbach's $\alpha$	Convergent Validity	Mean Inter-Item Correlation	Cumulative Percentage of variance	Pattern Loading	Organizational CSFs Items
<b>Group Factor 1</b>	0.935	0.818	0.591	47.030	0.602	Relationship of trust with

<b>Organizational Commitment And Relationship Development</b>		0.882 0.838 0.845 0.752 0.817 0.781 0.807 0.719 0.785				0.593 0.585 0.555 0.517 0.492 0.491 0.475 0.457 0.419	trading partners Employee cooperation Good quality of employee works outcomes Loyalty to organization Provide appropriate organizational structure Commitment of employee to organization's objectives Top management provide pro-active communication channel Communication with trading partners Establish partnership agreement Employee positive attitude towards e-Purchasing
<b>Group Factor 2</b>	0.935	0.877	0.828	52.608		0.856	Willingness organization to change
<b>Change Management</b>		0.884 0.839				0.855 0.830	Well managed process of change Have change management programs
<b>Group Factor 3</b>	0.924	0.808	0.582	56.789		0.834	Consultant IT own business and technical knowledge
<b>Technical Outsourcing And Top Management Responsibilities</b>		0.816 0.812 0.863 0.769 0.840 0.678 0.843 0.804				0.808 0.738 0.505 0.494 0.492 0.429 0.417 0.401	Consultant IT able to recommend appropriate e-Purchasing system Consultant IT support project team during implementation process Establish appropriate deadlines/ milestone for performance measurement Top management offers leadership Create performance measures User's knowledge and skills Conduct post-implementation review Top management willingness spend time and resources
<b>Group Factor 4</b>	0.907	0.788 0.739 0.778 0.766 0.756 0.765 0.580	0.585	60.800		0.872 0.762 0.668 0.665 0.512 0.512 0.506	Define project scope clearly Project activity properly coordinated and monitored Project plan consistent with IS plan Provide detail project plan Project team have strong domain knowledge Roles and responsibilities of project team properly define and delegated The organization has clear mission, vision, strategies and direction
<b>Group Factor 5</b>	0.918	0.786 0.824 0.903	0.793	64.013		0.847 0.828 0.819	Organization need experience with technology application Organizations experience able to employ IT effectively Organizations experience provides a base of knowledge for guiding

<b>Group Factor 6</b>						
<b>Stakeholder and Composition</b>	0.900	0.759	0.530	66.925	0.771	Stakeholders provide information and set requirements
		0.793			0.753	Identify level each stakeholder can involved
		0.791			0.682	Stakeholder early involvement
		0.841			0.570	Project team use effective project management techniques
		0.606			0.488	Readiness of trading partners
		0.785			0.474	Various cross-functional team members selected
		0.463			0.457	User's previous experience using IT application
		0.766			0.423	Project team has an experienced and reputable Project Manager
<b>Group Factor 7</b>						
<b>Organizational Policy and Strategic Plan</b>	0.913	0.792	0.635	69.490	0.586	Alignment of e-Purchasing strategy with IT strategy
		0.761			0.527	Incorporate e-Purchasing policy into existing procurement policy
		0.826			0.481	Reinforces commitment of employees
		0.732			0.453	Availability strategy plan sets which sets deadlines, responsibilities and financing
					0.433	Provides adequate training and education program
		0.843			0.415	Steering committee provides directions and guidance of implementation process
		0.806				
<b>Group Factor 8</b>						
<b>Business Process Innovation and External Collaboration</b>	0.927	0.852	0.614	72.010	0.734	Change the process according organization needs
		0.781			0.702	Simplify processes and eliminate redundancy activities
		0.784			0.651	Design and document important business processes
		0.866			0.633	Encourage innovation and learning processes
		0.833			0.537	Mutual understanding of needs and capabilities with trading partners
		0.842			0.479	Encourage sharing of knowledge and information
		0.826			0.450	Allow work cultural transformation towards initiatives
		0.706			0.437	Encourage organization build long term relationship with trading partners

## Correlation

For this paper, correlation analysis was used to examine the presence of relationship between the organizational CSFs of e-Purchasing and e-Purchasing implementation success. The result of this analysis would refine the organizational CSFs framework of e-Purchasing implementation success which shows relationship between independent variables and dependent variables. The PCFA analysis was limited to assess the relationship between inter-variable but not for intra-variable (between independence variables and dependence variables). The Spearman's rank order correlation

analysis was chosen and applied as this study was a non-parametric and using ordinal variable scaled.

Based on the results of correlation analysis, the relationship shown by the correlation coefficient has ranged from a high of 0.538 to a small of 0.191 which was statistically significant at  $p < 0.05$ . Two items of organizational CSFs was found uncorrelated with e-Purchasing implementation success in dimension of project management and user satisfaction which is being statistically non-significant at  $p > 0.05$ . From this findings the study considers to retained 52 items of organizational CSFs out of 54 items which representing 8 grouping factors that shows significantly relationship with e-Purchasing implementation success in dimension of project management success and user satisfaction. The components of organizational CSFs which presence the relationship with e-Purchasing implementation success in dimension of project management success and user satisfaction was summarised in Table 4 and Table 5.

Table 4: Result of Correlation Analysis (relationship with project management success)

Component	Organizational CSFs Item	Correlation Coefficient ( $r_s$ )
<b>Group Factor 1</b>		
<b>Organizational Commitment And Relationship Development</b>	Relationship of trust with trading partners (F42)	0.285 (moderate)
	Employee cooperation (F29)	0.307 (moderate)
	Good quality of employee works outcomes (F30)	0.332 (moderate)
	Loyalty to organization (F28)	0.366 (moderate)
	Provide appropriate organizational structure (F20)	0.348 (moderate)
	Commitment of employee to organization's objectives (F27)	0.312 (moderate)
	Top management provide pro-active communication channel (F21)	0.401 (moderate)
	Communication with trading partners (F43)	0.365 (moderate)
	Establish partnership agreement (F40)	0.334 (moderate)
	Employee positive attitude towards e-Purchasing (F31)	0.417 (moderate)
	Mean= 0.313 (moderate)	
<b>Group Factor 2</b>		
<b>Change Management</b>	Willingness organization to change (F36)	0.433 (moderate)
	Well managed process of change (F37)	0.398 (moderate)
	Have change management programs (F35)	0.346 (moderate)
	Mean = 0.392 (moderate)	
<b>Group Factor 3</b>		
<b>Technical Outsourcing And Top Management Responsibilities</b>	IT Consultant own business and technical knowledge (F53)	0.398 (moderate)
	IT Consultant able to recommend appropriate e-Purchasing system (F54)	0.369 (moderate)
	IT Consultant support project team during implementation process (F55)	0.428 (moderate)
	Establish appropriate deadlines/ milestone for performance measurement (F57)	0.396 (moderate)
	Top management offers leadership (F18)	0.461 (moderate)
	Create performance measures (F56)	0.399 (moderate)
	User's knowledge and skills (F44)	0.297 (moderate)
	Conduct post-implementation review (F58)	0.337 (moderate)
Top management willingness spend time and resources (F17)	0.352 (moderate)	
	Mean = 0.382 (moderate)	
<b>Group Factor 4</b>		
<b>Project Team Planning</b>	Project activity properly coordinated and monitored (F9)	0.187 (small)
	Project plan consistent with IS plan (F6)	0.259 (small)
	Provide detail project plan (F7)	0.286 (small)
	Project team have strong domain knowledge (F10)	0.266 (small)
	Roles and responsibilities of project team properly define and delegated (F11)	0.226 (small)
	The organization has clear mission, vision, strategies and direction (F1)	0.216 (small)
	Mean = 0.230 (small)	
<b>Group Factor 5</b>		
<b>Organizational</b>	Organizations experience able to employ IT effectively (F34)	0.251 (small)
	Organizations experience provides a base of knowledge for guiding (F33)	0.242 (small)



Learning		Mean = 0.210 (small)
<b>Group Factor 6</b>		
<b>Stakeholder and Composition</b>	Stakeholders provide information and set requirements (F26)	0.327 (moderate)
	Identify level each stakeholder can involve (F25)	0.341 (moderate)
	Stakeholder early involvement (F24)	0.375 (moderate)
	Project team use effective project management techniques (F14)	0.374 (moderate)
	Readiness of trading partners (F41)	0.312 (moderate)
	Various cross-functional team members selected (F12)	0.359 (moderate)
	User's previous experience using IT application (F46)	0.282 (small)
	Project team has an experienced and reputable Project Manager (F13)	0.359 (moderate)
		Mean = 0.341 (moderate)
<b>Group Factor 7</b>		
<b>Organizational Policy and Strategic Plan</b>	Alignment of e-Purchasing strategy with IT strategy (F4)	0.429 (moderate)
	Incorporate e-Purchasing policy into existing procurement policy (F2)	0.446 (moderate)
	Reinforces commitment of employees (F16)	0.413 (moderate)
	Availability strategy plan sets which sets deadlines, responsibilities and financing (F3)	0.314 (moderate)
	Provides adequate training and education program (F19)	0.428 (moderate)
	Steering committee provides directions and guidance of implementation process (F15)	0.341 (moderate)
		Mean = 0.395 (moderate)
<b>Group Factor 8</b>		
<b>Business Process Innovation and External Collaboration</b>	Change the process according organization needs (F51)	0.310 (moderate)
	Simplify processes and eliminate redundancy activities (F52)	0.429 (moderate)
	Design and document important business processes (F50)	0.337 (moderate)
	Encourage innovation and learning processes (F47)	0.333 (moderate)
	Mutual understanding of needs and capabilities with trading partners (F39)	0.338 (moderate)
	Encourage sharing of knowledge and information (F48)	0.288 (small)
	Allow work cultural transformation towards initiatives (F49)	0.375 (moderate)
	Encourage organization build long term relationship with trading partners (F38)	0.331 (moderate)
		Mean = 0.343 (moderate)

Table 5: Result of Correlation Analysis (relationship with user satisfaction)

Component	Organizational CSFs Item	Correlation Coefficient (rs)
<b>Group Factor 1</b>		
<b>Organizational Commitment And Relationship Development</b>	Employee cooperation (F29)	0.302 (moderate)
	Good quality of employee works outcomes (F30)	0.355 (moderate)
	Loyalty to organization (F28)	0.320 (moderate)
	Provide appropriate organizational structure (F20)	0.354 (moderate)
	Commitment of employee to organization's objectives (F27)	0.314 (moderate)
	Top management provide pro-active communication channel (F 21)	0.416 (moderate)
	Communication with trading partners (F43)	0.298 (small)
	Establish partnership agreement (F40)	0.261 (small)
	Employee positive attitude towards e-Purchasing (F31)	0.382 (moderate)
		Mean = 0.316 (moderate)
<b>Group Factor 2</b>		
<b>Change Management</b>	Willingness organization to change (F36)	0.453 (moderate)
	Well managed process of change (F37)	0.407 (moderate)
	Have change management programs (F35)	0.360 (moderate)
		Mean = 0.407 (moderate)
<b>Group Factor 3</b>		
<b>Technical Outsourcing And Top Management Responsibilities</b>	IT Consultant own business and technical knowledge (F53)	0.345 (moderate)
	IT Consultant able to recommend appropriate e-Purchasing system (F54)	0.415 (moderate)
	IT Consultant support project team during implementation process (F55)	0.440 (moderate)
	Establish appropriate deadlines/ milestone for performance measurement (F57)	0.498 (moderate)
	Top management offers leadership (F18)	0.538 (strong)

	Create performance measures (F56)	0.480 (moderate)
	User's knowledge and skills (F44)	0.308 (moderate)
	Conduct post-implementation review (F58)	0.406 (moderate)
	Top management willingness spend time and resources (F17)	0.460 (moderate)
	Mean =	0.432 (moderate)
<b>Group Factor 4</b>		
<b>Project Team Planning</b>	Define project scope clearly (F8)	0.271 (small)
	Project activity properly coordinated and monitored (F9)	0.266 (small)
	Project plan consistent with IS plan (F6)	0.263 (small)
	Provide detail project plan (F7)	0.286 (small)
	Project team have strong domain knowledge (F10)	0.311 (moderate)
	Roles and responsibilities of project team properly define and delegated (F11)	0.355 (moderate)
	The organization has clear mission, vision, strategies and direction (F1)	0.235 (small)
	Mean =	0.284 (small)
<b>Group Factor 5</b>		
<b>Organizational Learning</b>	Organizations experience able to employ IT effectively (F34)	0.191 (small)
	Organizations experience provides a base of knowledge for guiding (F33)	0.252 (small)
	Mean =	0.183 (small)
<b>Group Factor 6</b>		
<b>Stakeholder and Composition</b>	Stakeholders provide information and set requirements (F26)	0.407 (moderate)
	Identify level each stakeholder can involve (F25)	0.337 (moderate)
	Stakeholder early involvement (F24)	0.380 (moderate)
	Project team use effective project management techniques	0.416 (moderate)
	Readiness of trading partners (F14)	0.373 (moderate)
	Various cross-functional team members selected (F12)	0.393 (moderate)
	User's previous experience using IT application (F46)	0.282 (small)
	Project team has an experienced and reputable Project Manager (F13)	0.399 (moderate)
	Mean =	0.373 (moderate)
<b>Group Factor 7</b>		
<b>Organizational Policy and Strategic Plan</b>	Alignment of e-Purchasing strategy with IT strategy (F4)	0.457 (moderate)
	Incorporate e-Purchasing policy into existing procurement policy (F2)	0.473 (moderate)
	Reinforces commitment of employees (F16)	0.534 (strong)
	Availability strategy plan sets which sets deadlines, responsibilities and financing (F3)	0.355 (moderate)
	Provides adequate training and education program (F19)	0.466 (moderate)
	Steering committee provides directions and guidance of implementation process (F15)	0.343 (moderate)
	Mean =	0.438 (moderate)
<b>Group Factor 8</b>		
<b>Business Process Innovation and External Collaboration</b>	Change the process according organization needs (F51)	0.314 (moderate)
	Simplify processes and eliminate redundancy activities (F52)	0.385 (moderate)
	Design and document important business processes (F50)	0.360 (moderate)
	Encourage innovation and learning processes (F47)	0.346 (moderate)
	Mutual understanding of needs and capabilities with trading partners (F39)	0.376 (moderate)
	Encourage sharing of knowledge and information (F48)	0.354 (moderate)
	Allow work cultural transformation towards initiatives (F49)	0.415 (moderate)
	Encourage organization build long term relationship with trading partners (F38)	0.261 (moderate)
	Mean =	0.364 (moderate)

## Discussion

The result of PCFA has established components of the organizational CSFs of e-Purchasing implementation success. In this analysis there were eight (8) components of main factors (factor groupings) comprises 54 items was selected based on the setting-out criterion for selecting the components which was grounded on the eigenvalues and percentage total variance explained. Thus, PCFA has reduced the number of factor grouping to eight (8) dimensions/groupings which present relationships among sets of many inter-related variables. This structure framework of organizational

CSFs of e-Purchasing produced was statistical validate and all items in the framework shows high internal consistency and satisfied validity through homogeneity, reliability and discriminant validity.

On the other hand, correlation analysis has generates relationship between organizational CSFs to e-Purchasing implementation success. The results of correlation analysis shown the correlation coefficient has ranged from high to small. It was reveals that higher relationship correlation acquired was related to high rating degree of CSFs agreement by respondents, vice versa to moderate and small relationship correlation. The findings was also reveals that there is no significant different values on correlation strength for dimension of project management success and user satisfaction which refers to two indicators measuring e-Purchasing implementation success. This shows that it has perceived a same degree of agreement among the respondents for predicting relationship between the organizational CSFs of e-Purchasing and e-Purchasing implementation success. The findings of this correlation analysis were provides a new framework of an empirical logical relationship of the organizational CSFs with e-Purchasing implementation success. Thus, this new framework as indicate in Figure 1 were initial framework of the organizational CSFs of e-Purchasing implementation success.

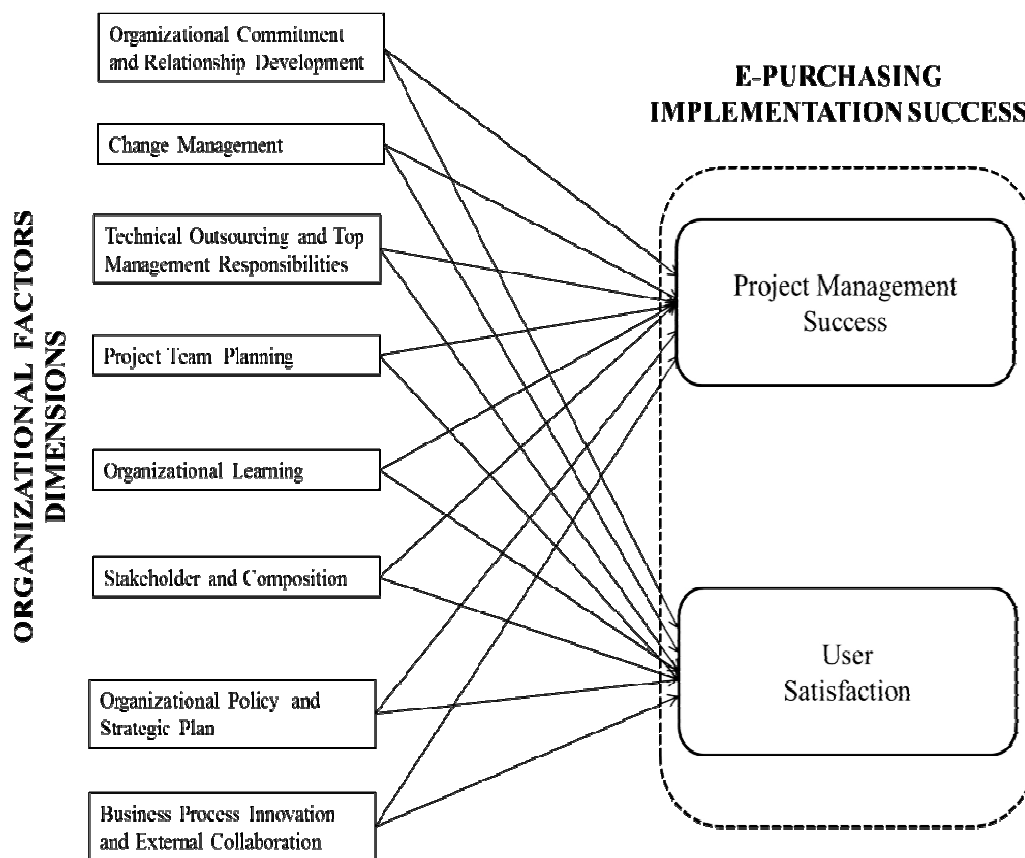


Figure 1: Modify organizational CSFs of e-Purchasing Implementation Success Framework

## Conclusion

This paper reported the results and findings from an empirical survey on the organizational CSFs of e-Purchasing implementation success in construction organizations. e-Purchasing is a useful tools that construction businesses can turn to, in order to achieve a competitive edge over other companies. The main contribution of this study is providing a new framework for studies of construction organizational CSFs in e-Purchasing implementation in Malaysian construction organizations context. This study is probably the first to study e-Purchasing implementation projects in Malaysia from construction e-Purchasing system perspective. This study will thus add to the growing of knowledge on e-Purchasing implementations in construction industry in developing countries. 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. This paper concluded that organizational commitment and relationship development; change management; technical outsourcing and top management responsibilities; project team planning; organizational learning; stakeholder and composition; organizational policy and strategic plan; and business process innovation and external collaboration are important CSFs and have a statistical relationship for successful e-Purchasing implementation. In order to investigate the contribution of the variance of the 52 items CSFs for the implementation of e-Purchasing, this study suggests for further analysis using datasets such as multiple regression analysis for research work in the future. By doing this it will provide more meaningful piece of works for theories development of CSFs, research community as well for industry practices.

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