E-Procurement Systems: Examining the Effect of End-User Satisfaction on Individual Performance

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Abstract- *End-user satisfaction and individual performance have been identified by many researchers as critical determinants of the success of information systems. As an escalating number of organizations now utilize e-procurement systems, there is a desire to understand their effect on individual end-user's performance. Therefore, this research attempts to empirically examine a framework identifying the relationships between end-user satisfaction, and individual end-user performance, in addition to assessing the impact of three proposed antecedents of end-user satisfaction: professionalism, training and usability. Data gathered from 432 end-users of ePerolehan system in the Malaysian government agencies were utilized to examine the relationships proposed in the framework using the Partial least square (PLS) approach. The findings provide strong support for our model. Our results indicate three factors professionalism, training and usability significantly affect end-user satisfaction, while the higher levels of end-user satisfaction leads to improved individual performance.*

Keywords- *E-procurement; User satisfaction; Individual performance*

1. INTRODUCTION

Most organizations regardless whether they are private or public sector are now using information system (IS), particularly the Internet. As such both these sectors have become IT-enabled. One of the IT enabled system is the e-Procurement system. Many organizations are using e-Procurement. The same can be said for government e-Procurement. Goldfinch (2007) points out that the chance to succeed in e-Government projects is only 30%. The same percentage is applicable to the government e-Procurement system as part of the integral component of e-Government project (Panda & Sahu, 2012). As such, Government needs to evaluate the success factors that can assist them to successfully perform government projects. Most of government projects are highly scaled and costly, thus successful implementation of the government e-procurement systems is essential.

The IS literature considers a system to be effective or successful when it encompasses return on investment, elevates organizational productivity, improves outcome quality, increases user satisfaction, and sustains use by organizational employees (Díez & McIntosh, 2009). DeLone and McLean (1992) propose an IS success model by distinguishing six dimensions of IS success, that include system quality, information quality, information use, user satisfaction, individual impact and organizational impact. For example, user satisfaction is found to be a crucial determinant of system success and effectiveness (DeLone & McLean, 1992; Thong & Yap, 1996).

Therefore, success of a system is considered to be the extent to which a presented IS essentially makes a contribution to achieving business objectives (Hamilton & Chervany, 1981). Evaluating the success of systems within businesses is certainly recognized as the single most critical issue of IS management discipline (Ball & Harris, 1982). IS Scholars use various techniques to assess systems' success such as investigating success of a system via the system usage, user satisfaction and other categories of performance (Petter & Fruhling, 2011; Thong & Yap, 1996; H. C. Wang & Chiu, 2011). Interestingly, many prior literature note user satisfaction to be a surrogate measure for system success, and have use user satisfaction to assess the success implementation of a IS (Ainin et al., 2012; Al-Khaldi & Olusegun Wallace, 1999; Bailey & Pearson, 1983; Gelderman, 1998). As such, this paper uses user satisfaction as a measure to assess the successful implementation of government e-Procurement. Prior studies have indicated that user satisfaction can be influenced by numerous factors, such as perceived ease of use (Al-hawari & Mouakket, 2010; Son et al., 2012), service quality (Dwivedi et al., 2013; Klobas & McGill, 2010), and perceived usefulness (Lim et al., 2013; Udo et al., 2012), . However, this study confines to factors that relate to the support and provisions of the e-Procurement system itself that focus on the professionalism, training and usability of the e-procurement systems by internal users (i.e., employees). Moreover, this study focused on the mandatory IS (Brown et al., 2002), which is still scarce in studies on system success or failure (Abdelsalam et al., 2012; Ajami & Bertiani, 2012; Ram et al., 2013).

The aim of this paper is to identify the relationship between user satisfaction and individual performance. In addition, this study also aims to verify whether professionalism, training and usability influences user satisfaction.

2. LITERATURE REVIEW

2.1. Theoretical background

The impact of IS on individual performance indicates the actual performance of the user of a specific IS (Hou, 2012). DeLone and McLean (1992) state that user performance impact is also a sign that the given IS has provided the user a good knowledge of the decision context, has enhanced the user productivity, or has evolved his or her perception of the value or effectiveness of the IS. End-user satisfaction is among the most favored indicator of success of an information system (DeLone & McLean, 1992). The common argument of the user satisfaction approach is the fact that higher level of user satisfaction leads to higher level of user performance (Kositanurit et al., 2011). Over the last decade, there have been several attempts to anticipate the satisfaction of users towards IS implementation. Several researchers attempts to find out the factors of the IS that cause maximum user performance through user satisfaction (DeLone & McLean, 1992; Hendrickson et al., 1994; Hou, 2012). Nevertheless, it can be clearly seen that most of the existing studies concentrates on IS that are used on a voluntary usage, rather than mandatory usage. Thus, the suitability of previous findings in the context of mandatory use remains unclear (Chan et al., 2010), and require deeper analysis. In a mandatory usage scenario, user satisfaction is relatively very important as indicator   of success (Brown et al., 2002). For example, Brown et al. (2002) mention that the dependent variable "use" is not suitable in mandatory use context; and recommended replacing it with satisfaction variable. Lu et al. (2012) point out that when an organization forces its users to use a particular system, greater emphasis should be placed upon usage satisfaction. User satisfaction is one of the well-known concepts in organizational psychology, and researchers have defined this concept in various ways. Au et al.(2008) define user satisfaction as the sum of experiences that user acquires from his/her interaction with the technology over time, and represent users' cognitive evaluation of the entire IS user experience. In this study, the researcher considers users' satisfaction as the main outcome of a mandated e-Procurement system by government, and thus based on Venkatesh et al. (2003) work, investigate a set of antecedents to satisfaction, which indicates that there is a positive correlation between technology perception and user acceptance. Departing from this notion, this paper attempts to examine three variables: perceived professionalism, perceived training and perceived usability.

2.2. The research model

Figure 1 presents the research model created in this study. The research model suggests that end-user satisfaction will have a positive direct impact on individual performance. In addition, end-users satisfaction is influenced by three constructs: professionalism, training and usability. In line with the literature review, we propose and test four hypotheses addressing (a) the relationship between professionalism and end-user satisfaction, (b) the relationship between training and end-user satisfaction, (c) the relationship between usability and end-user satisfaction, and (d) the relationship between end-user satisfaction and individual performance.

2.3. Factors influencing user satisfaction

There are many factors that influence users' satisfaction. However there are three that is related to the systems support and provision i.e. professionalism of the technical support , training provided by the technical support and usability of the systems (Alistair Brandon-Jones, 2006; Delone, 2003; DeLone & McLean, 1992).
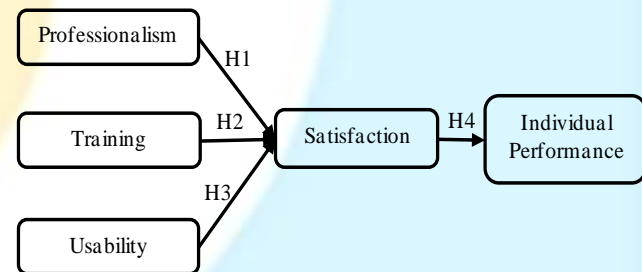

Figure 1: The Research Model

Professionalism refers to the continual technical support given to e-Procurement system users (Alistair Brandon-Jones & Carey, 2011). Professionalism highlights support availability and responsiveness of specialized expertise to settle system issues in a flexible and effective way (Alistair Brandon-Jones, 2006). However, the main function to IS department is to provide services to internal users (Pitt et al., 1995). Furthermore, when IS department supplies the users with training support and improves their system knowledge, the relationship between IS and the users will positively improve (Pitt et al., 1995). Technical support is essential in assisting users to operate the software and the hardware, and additionally, providing technical support enhances user satisfaction towards the system (Croom & Johnston, 2003). Technical support was highlighted in several studies, which revealed the fact that system success is influenced by system support (Tukamuhabwa, 2012). In the same vein, previous literature explains the relationship between internal service quality and system user attitude toward the system. Pitt et al. (1995) imply that service quality is considered as a remarkable indicator of user satisfaction. They also reveal that service quality influences user satisfaction regardless if a user interacts with a single or multiple information systems.

H1: User satisfaction is positively influenced by perceived professionalism

Training refers to the provision of system users with the logic and needed knowledge to utilize e-Procurement system (Mandal & Gunasekaran, 2002). Organizations concerned in providing training to their users to improve their knowledge levels and sharpen their skills, resulting in a leveraging system quality (McGill & Klobas, 2005). Training the employees to a level that can leverage their ability to handle the system is shown to be vital for realizing the system's benefits (Norton et al., 2012). In an e-Procurement context, training users to use the e-Procurement system will improve their ability to handle their job task and reduce the maverick-buying behavior (Karjalainen & van Raaij, 2011). Raymond (1990) points out that training is one of the main factors that affect system user acceptance. Raymond and Bergeron (1992) state that user training influences user's decision-making satisfaction. Consequently, specific and quality training programs that satisfy system end users is essential when the business make huge investments in information technology (Benedict et al., 1997).

H2: User satisfaction is positively influenced by training.

Usability refers to "the perceived ease of use and navigation around an e-Procurement System" (Alistair Brandon-Jones & Carey, 2011). If a mandatory system is troublesome to use, then users will probably be disappointed, and experience the degree of required efforts to be relatively high, when contrarily, the perceived effort needed to use a mandatory system should be minimal (Berry et al., 2002). Bias and Mayhew (2005) state that usability improves user satisfaction and productivity, while Kim and Eom (2002) determined that usability is of a magnitude of significance in forming user satisfaction. Zhang and Galletta (2006) posited that the main aim of IS Interaction is to boost the usability of systems.

H3: User satisfaction is positively influenced by perceived usability.

2.4. End-user satisfaction and individual performance

Earlier research provided empirical evidences about the positive impact of user satisfaction on individual performance (Gatian, 1994; Guimaraes & Igbaria, 1997; Igbaria & Tan, 1997). For instance, Guimaraes and Igbaria (1997) discovered that end user satisfaction has significant relationship on end-user job performance in server/client.in addition, Hou (2012) found that user satisfaction has strong direct influence on users performance in business intelligence systems context. Moreover, DeLone and McLean (1992) mentioned the possible influence of user satisfaction on users performance. Thus, this study proposes that end users satisfaction would have a significant positive influence on individual performance.

H4: *Individual performance is positively influenced by end-user satisfaction.*

3. RESEARCH DESIGN AND METHOD

3.1. Respondents and Data Collection

This study applies the cross-sectional empirical research design in order to examine the factors that influences end user satisfaction in a mandatory system environment.

The popularity of e-procurement system practices is increased due to its huge benefits. Referring to e-procurement systems literature, many studies provide evidence of the benefits of implementing e-procurement system and its impacts on the private and public organizations (Díez & McIntosh, 2009; Hsiao & Teo, 2005). Many firms experienced e-procurement systems and due to its efficiency and effectiveness, most of them are satisfied with its performance (Rask & Kragh, 2004). Recently, e-procurement system is considered as a significant means in business. It improves communications between buyer and suppliers, reduces transaction and administration costs, provides wider base of buyers and suppliers, improves delivery and logistic functions, and reduce paper-base work (Gunasekaran & Ngai, 2008; Hsiao & Teo, 2005). In the same vein, the Malaysian government implemented e-Government technologies to fulfill the aim of enhancing internal government operations, as well as external services to Malaysian citizens and businesses (ePerolehan Official Portal). Among the application introduced was the ePerolehan. It was first introduced in 2000 and is an end-to-end, multi-buyer, multi-supplier e-procurement system that allows Government Agencies across Malaysia to electronically purchase products and services from both local and international suppliers. It employs online technologies to connect Malaysia's Government Agencies and Suppliers all over the world into a digital transacting environment (Rashid, 2007). ePerolehan offers and switches traditional manual procurement procedures into an electronic procurement system (Rashid, 2007). The use of the ePerolehan system is mandated among system users in all the government Ministries, agencies and departments. It was reported that the system recorded up to RM14 billion (US$4.6) in transactions (IOS Press, 2011). For this study, the participants are employees that are users of the ePerolehan system in Malaysian Government and agencies the participants are direct users of the system who are working in purchasing departments. The direct users of the system are the suitable respondents to this study, because they interact directly with the system; therefore, they have the ability to express their perceptions of the system.

The empirical data for this study was collected by using survey questionnaire. A questionnaire that reflects the proposed framework constructs was developed to collect the primary data for the study. A seven-point Likert scale ranging from (1) strongly disagrees to (7) strongly agree was employed to rate the extent to which respondents agree to the statements. Pre-testing for the questionnaire was conducted to confirm the face and content validity by panel of experts in IS field and their necessary suggestions were taken into consideration. Pilot study was collected

and primary internal consistency was investigated to ensure the reliability of the proposed constructs. A total of 1000 e-Perolehan system end-users were randomly selected to voluntarily complete a confidential questionnaire. 442 e-Perolehan end users returned the questionnaire yielding a response rate of 44.2%. Of these, only 432 were completed questionnaires were complete and useable, with the final response rate of 43.2%.

3.2. Measures of the Constructs

The research model contains five constructs; one dependent construct, one mediating construct and three independent constructs. All constructs' measurements are adopted from previous studies. Individual performance is a dependent construct, its measurements are adopted from Igbaria and Tan (1997) and Kositanurit et al. (2011).User's satisfaction is a mediating construct, its measurements are adopted from Palvia (2009) and Wixom and Todd (2005). The three independent constructs are: perceived professionalism, and its measures are adopted from Alistair Brandon-Jones and Carey (2011); perceived training and its measures are adopted from Alistair Brandon-Jones and Carey (2011) and Amoako-Gyampah and Salam (2004); perceived usability with measures that are adopted from Alistair Brandon-Jones and Carey (2011) and Davis (1989) (see Table 1).

4. DATA ANALYSIS AND RESULTS

SmartPLS 2.0.M3 is used as the main statistical analysis tool to purify the measurement items and test the hypothetical relationship.

4.1. Measurement Model

To assess the reliability and validity of constructs, confirmatory factor analysis is performed. Factor cross loading shows that all items are loading on their construct more than other constructs, the loading of each item on its construct is more than (0.70) (see Table 2).

All the constructs were tested for reliability by using composite reliability and Cronbach's alpha. Compared to Cronbach's alpha, Composite reliability is acknowledged as a more rigorous assessment of reliability (Chin, 1998). As shown in Table 3, the result of composite reliability and Cronbach's Alpha for all constructs were greater than (0.80), which indicates that all construct measures are reliable. Constructs validity were assessed by investigating the convergent and discriminant validities. Convergent validity was evaluated by the average variance extracted (AVE) values. As demonstrated in Table 3, the AVE for all constructs is more than the threshold value of (0.50) (Hair Jr et al., 2014). Furthermore, discriminant validity is evaluated by comparing the square root of AVE values for each construct, with the correlation values located between the construct and other constructs (Chin, 1998). As illustrated in Table 4, all square roots of AVEs are larger than constructs correlations, implying that the variance outlined by the particular construct is greater than the measurement error variance. Thus, all constructs

demonstrated an acceptable level of convergent validity and discriminant validity.

4.2. Structural Model

Figure 2 demonstrates the test results of the three hypothesis executed by PLS. The overall assessment of the model is shown in Table 5, and all P-values are significant, which leads to conclude that three hypotheses are supported. The linear regression coefficients of perceived professionalism ($\beta= 0.224$, $p < 0.000$), training ($\beta= 0.286$, $p< 0.000$), and usability ($\beta=0.286$, $p<0.000$) were all significant. The results provide evidence of the contribution of all of the factors to end users satisfaction in mandatory use systems. R^2 of (0.463) shows that about 46.3 % of User satisfaction can be explained by perceived professionalism, usability, and training.

Table 1. measurement items of the constructs

Construct	Items
Individual performance	IPI1: Using e-procurement system in my job helps me to be more effective.
	IPI2: Using e-procurement system in my job has a positive impact on my productivity.
	IPI3: Using e-procurement system in my job improves my job performance.
User's Satisfaction	SAT1: I am very pleased with using e-procurement system in my work.
	SAT2: My interaction with e-procurement system is very satisfying.
	SAT3: All things considered, I am very satisfied with e-procurement system.
Professionalism	PRF1: The procurement division always gets back to me when they say they will.
	PRF2: The procurement division responds quickly to my queries or problems.
	PRF3: The procurement division is flexible when dealing with unusual requests or problems.
	PRF4: The procurement division shows concern when dealing with my queries or problems.
Training	TRN1: The procurement division provides me with appropriate and specific training to use the system.
	TRN2: My level of understanding was improved after going through the training program.
	TRN3: The training gave me confidence in using e-procurement system.
	TRN4: The training was very detailed and at adequate length.
Usability	USB1: The e-procurement system moves smoothly from one screen to the next.
	USB2: The e-procurement system allows easy navigation through the process.
	USB3: The e-procurement system is easy to use.

Table 2. Factors Cross Loading

	IPP	PRF	SAT	TRN	USB
IPP1	**0.894**	0.504	0.717	0.488	0.573
IPP2	**0.943**	0.548	0.772	0.523	0.608
IPP3	**0.909**	0.486	0.820	0.589	0.581
PRF1	0.481	**0.872**	0.445	0.510	0.441
PRF2	0.490	**0.894**	0.463	0.479	0.469
PRF3	0.512	**0.890**	0.530	0.575	0.495
SAT1	0.787	0.537	**0.914**	0.548	0.537
SAT2	0.782	0.494	**0.930**	0.582	0.531
SAT3	0.775	0.482	**0.937**	0.549	0.572
TRN1	0.530	0.572	0.501	**0.863**	0.598
TRN2	0.493	0.474	0.515	**0.887**	0.554
TRN3	0.528	0.414	0.531	**0.880**	0.579
TRN4	0.477	0.592	0.542	**0.836**	0.520
USB1	0.551	0.394	0.517	0.580	**0.876**
USB2	0.563	0.479	0.515	0.567	**0.937**
USB3	0.602	0.543	0.546	0.590	**0.866**

Table 3. Constructs Measurement Model Assessment

Constructs	Items	Loading	AVE	Composite Reliability	Cronbachs Alpha
Individual Performance (IPP)			0.838	0.940	0.903
	IPP1	**0.894**			
	IPP2	**0.943**			
	IPP3	**0.909**			
Satisfaction (SAT)			0.859	0.948	0.918
	SAT1	**0.914**			
	SAT2	**0.930**			
	SAT3	**0.937**			
Professionalism (PRF)			0.784	0.916	0.862
	PRF1	**0.872**			
	PRF2	**0.894**			
	PRF3	**0.890**			
Training (TRN)			0.751	0.923	0.889
	TRN1	**0.863**			
	TRN2	**0.887**			
	TRN3	**0.880**			
	TRN4	**0.836**			
Usability (USB)			0.799	0.922	0.873
	USB1	**0.876**			
	USB2	**0.937**			
	USB3	**0.866**			

Table 4. Correlation matrix of constructs

	AVE	IPP	PRF	SAT	TRN	USB
IPP	0.838	0.916				
PRF	0.784	0.559	0.885			
SAT	0.859	0.843	0.544	0.927		
TRN	0.751	0.585	0.592	0.604	0.867	
USB	0.799	0.641	0.530	0.590	0.649	0.894

Items on the diagonal are square roots of AVE scores
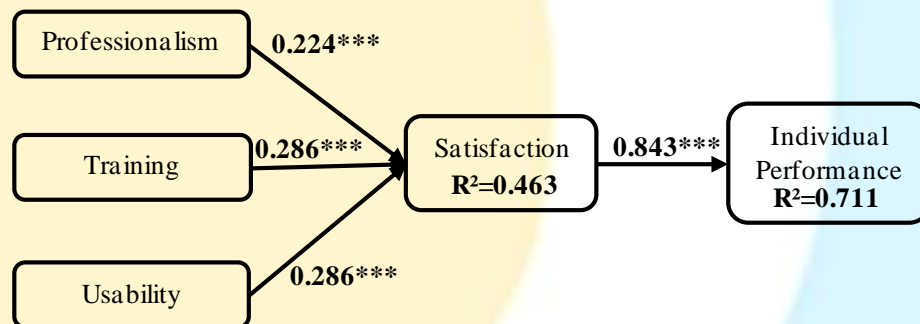
Level of significance: * p<0.10   **p<0.05   ***p<0.01
Figure 2: Measurement Mode

Table 5. Structural Model

Hypothesis	Path Coefficient	Sample Mean	Standard Deviation	T Values	P Values	Result
SAT -> IPP	0.843	0.843	0.017	48.809	0.000	Supported
PRF -> SAT	0.224	0.222	0.045	4.935	0.000	Supported
TRN -> SAT	0.286	0.281	0.049	5.885	0.000	Supported
USB -> SAT	0.286	0.292	0.055	5.214	0.000	Supported

5. DISCUSSION

In addition to the impact of end-user satisfaction on individual performance, this study analyzes the impact of three factors: Professionalism, training, and usability on end-user's satisfaction in a mandatory use environment. All three variables are significant antecedents, and training plays the most important role in influencing user satisfaction. The results of this research are consistent with the findings of prior studies in IS. However, the impact of professionalism on user satisfaction has reported a significant relationship in the study by Y.-S. Wang and Liao (2008), training has a direct effect on user satisfaction in studies conducted by Al-Gahtani (2004), additionally, usability showed a significant relationship with satisfaction in recent study by Belanche et al. (2012), furthermore,

studies by Guimaraes and Igbaria (1997) and Hou (2012) found that user satisfaction has strong direct influence on users performance. The results of this study prove the importance of professionalism, training and usability in enhancing and boosting end users satisfaction and as a result improving individual performance.

6. LIMITATIONS & FUTURE RESEARCH

The main limitation of this study is the generalizability of the results; as the study framework is investigated in the context of developing country, e.g. Malaysia. It is plausible that developing countries are different from developed countries and undeveloped countries in terms of political, social, administrative, and economic characteristics, such as the nature of economy, the level of technology, and the quality of human resources etc.

(Palekar, 2012). Those differences may have significant influence on the research model's results. To improve the generalizability of the results the replication of study framework in different contexts; such as, developing countries or undeveloped countries. Another limitation is the absence of some other important factors that might significantly influence end-user's satisfaction (e.g., trust, information quality). In the future, we wish to introduce these factors into the model in order to strengthen the explanatory power of this model.

7. CONCLUSION

This study develops a model to investigate the factors affecting end-user's satisfaction in mandatory use systems and the impact of end-user satisfaction on individual performance. The results demonstrate that three factors: perceived professionalism, training, and usability have significant positive and direct effects on ePerolehan's end-user's satisfaction which also has direct positive impact on individual performance. In general, the finding of this study enriches the knowledge of mandatory system use environment. Thus, the study provides suggestions into how to improve the mandated environment in the context of government e-Procurement system and the internal users, which is the employee of government agencies.

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