

A SUCCESS MODEL FOR THE MALAYSIAN GOVERNMENT E-PROCUREMENT SYSTEM: THE BUYER PERSPECTIVE

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ABSTRACT

In Malaysia, there has been a tremendous effort in implementing e-government as a national agenda with the aims to increase public transparency, improve the sector efficiency and effectiveness and reduce public expenditure through lower operational costs. One of the e-government applications is the ePerolehan, a government-to-business (G2B) system that enables online public procurement coordination and transaction between government and businesses. However, there has been a lack of empirical research findings in evaluating the success and actual value of the system, and understanding the usage factors among government users. Hence, this research was undertaken to investigate the level of ePerolehan system success and the factors that contribute to this success, as perceived by the government users. The structural equation modeling results suggest the use of the Malaysian public e-procurement system has significant and positive influence to success, measured as transparency, service performance, efficiency and information quality. The results also indicated that the main significant success factors of the ePerolehan system are found to be system compatibility, user attitude, organizational learning, mimetic pressure and supplier expectation. The findings provide several important implications not only for the government-to-business discipline, but also for e-government research and practice.

Key words: government-to-business; public e-procurement; public e-procurement success; public e-procurement use factor

INTRODUCTION

The Internet age and the vision to be a developed country have initialized Malaysia to reform the government administration that enable for automated interactions with other government agencies, businesses and citizens via e-government applications. While there seem to be a number of e-government activities, the one that gives the most significant impact to the Malaysian administration, social and economic structure is the public e-procurement system,

known as *ePerolehan*. The decision to automate the public sector business processes via *ePerolehan* is seen among others as a mean to improve transparency and service quality (Zaaba, 2008).

ePerolehan, was first initiated in 1999 with the aims to streamline public procurement processes and improve the quality of services. The missions and goals of *ePerolehan* are to improve transparency, to provide a more economical operation and to offer a user friendly system (Zaaba, 2008). *ePerolehan* is a multi-buyer, multi-supplier electronic procurement domain, which allows government agencies to function as independent buying entities under a single buying organization. It provides a standard procurement method for both goods and services following the government's procurement policy and procedure (Rashid, 2007). With the system, purchasing interactions and transactions between the federal government users as the buyers and the suppliers as the sellers can be conducted online.

The system is administered and managed by a unit in the Ministry of Finance, known as the ePerolehan Unit. In general, the unit is responsible for system monitoring, implementation and maintenance, data centre operation, user training, technology transfer and policy and procedure implementation. Two main users of the system are federal government agencies as the buyers and business organizations as the suppliers. Seven modules encompass the *ePerolehan* functions, which are supplier registration, central contract, direct purchase, quotation system, tender system, ministry contract and e-bidding.

From the research perspective, although the Malaysian administration has succeeded in convincing the business organizations and federal government agencies to accept and use the *ePerolehan*, the extent to which the actual success has been achieved remains scarce. This may be due to its maturity level. Nevertheless, few studies were conducted to gauge the adoption and acceptance level from the two perspectives. Mohd. Salleh, Rhode and Green (2006) are probably one of the first researchers who explored the *ePerolehan* adoption. Their study's focal point is on the enacted capabilities of small and medium size enterprises. Top management information system skills and knowledge, and trust in trading partners were found to dominate the effect on adoption among business suppliers. Another research in the area was conducted by Kaliannan, Awang and Raman (2007) who investigated the acceptance of *ePerolehan* among individual business users. While both studies focused on the business organizations, an attempt was made by George (2007) to examine factors that relate to the *ePerolehan* acceptance among government users. Although the study discovered system quality, information quality, service quality, perceived usefulness and facilitating conditions as the factors that influence *ePerolehan* acceptance, there was no indication of the success investigation. Besides, thus far reports based on empirical studies have not mentioned on the success of the *ePerolehan* implementation. Therefore the study is aimed at examining and testing the stated goals of *ePerolehan* and investigating the determinants of its success from the viewpoint of government organizations as the buyer.

In this paper, we present a framework which clarifies the function of public e-procurement system. Next, we discuss on the information system success and a model that has been used extensively to evaluate the values and benefits of information systems. This provides a basis for introducing a proposed success model for the Malaysian government e-procurement system.

REVIEW OF RELATED LITERATURE

E-Procurement System in the Government Administration

The electronic procurement (e-procurement) is a type of business-to-business (B2B) application, in which acquisitions of goods and services for organizations is conducted electronically (Chang, Markatsoris & Richards, 2004). The key purpose of turning traditional procurement to electrical conduct is to improve the coordination and management of all purchasing activities (Turban, King, Lee & Viehland, 2006). In traditional procurement, problems such as inefficient buying, redundant and disconnected processes, non-strategic sourcing and maverick purchases are frequent. This provides a challenge to the field of information systems. Fortunately, the problems can be effectively addressed by e-procurement solutions. In B2B, e-procurement is a central function, and has become an essential practice towards efficient and effective business performance (Neef, 2001).

In the context of government application, public e-procurement system is a type of government-to-business system (G2B). The main agenda is for value creations in which to reduce transparency (Moe, 2004) and improve information flow and management for more informed decision making (Amit & Zott, 2001). Vaidya, Yu and Soar (2002) also highlighted on the detail objectives for e-procurement system in public sector. These include to increase top-level funding availability, create open market, harness aggregated buying power of the government to achieve dynamic pricing of goods and services, improve efficiency of the procurement cycle while meeting all legislative mandates and ensure compliance with purchasing policies, both within departments and across the government agencies.

Leipold, Klemow, Holloway & Vaidya (2004) discussed on the general characteristics of public procurement. These are:

- the governmental purchasing system administrates the money that belong “to all” and the supply of goods must serve the public wealth.
- there are prescribed procedures that result from a number of laws, directives, directions, judgments and administrative or political decisions.
- the variety and the number of the purchased products are greater for the public sector. Also the number of customers (governmental agencies) and the suppliers of the governmental purchasing system is excessively large.
- transparency is the basic requirement of the public sector’s purchasing procedures. The suppliers’ objections are the common practice.
- the unified public procurement plan for all governmental agencies and the information exchange between them is not usual for the private sector.

In addition, research in the public e-procurement system can be synthesized from various perspectives which include economics of scale, social practices, behavior, process approach and information system. Based on the information system life cycle, the related literature were grouped into two distinct parts; development stage research and operational stage research.

System Acceptance/Usage

Challenges, benefits, drivers and barriers are discussed in the e-procurement acceptance/ usage stream. In this stream, the usage is studied from three views; the government users, the suppliers and both government users and suppliers.

Research that investigate the acceptance from the government side include Moe (2004) who suggested the reasons for lack of e-procurement adoption among government officials are due to process conflicts, technical problems and costly solutions. A study conducted by Md Mahbubur (2008) confirmed the acceptance of e-procurement system among government employees depend on the support from both the management team and the vendor. The study further indicates more than one single theoretical framework is necessary for understanding the acceptance factors, which have been found as perceived usefulness, ease of use, employee involvement, system reliability and training. Another study conducted by Henriksen and Anderson (2005) found acceptance strategy is driven by rational process related to improved efficiency, which is capability and effectiveness.

Although public e-procurement is owned by the government, several studies attempt to understand the factors of acceptance and usage among the supplier firms. Costs, infrastructure and skills, change management, system constraint and government policy are the concerns that slow down the adoption rate among the business suppliers.

Interestingly, Chu et al., (2004) investigated the e-procurement usage factors from both spectrums; public buyers and private businesses. Using the Theory of Planned Behavior, Chu et al., (2004) found behaviour to use e-procurement system was driven by the intention to use. The authors also uncovered facilities and information accuracy played a critical role in the adoption behaviour and perceived behavioural control was a significant mediating adoption factor among the government and business users.

Process Management

Although process management is not well researched in public e-procurement studies, it still sparks interests to some. Research in this area sheds some lights on the public e-procurement processes by indicating public organizations need to develop new buying skills in market management, specification, competitive process, negotiation regulation and monitoring. In addition, the debates of market vs hierarchy and dis- vs reintermediation have been emphasised in electronic markets for private sector. Taking the lead, Klein and Teubner (2000) developed a differentiated framework that facilitated the understanding of threats and chances resulting from inter and cybermediation on public sector procurement.

System Evaluation

The system evaluation discipline started with a study on understanding the development process and adoption success for the South Korean Government e-Procurement System (GePS). The results suggested high capacity of information system and institutional collaboration among public agencies are the essential foundations for the successful establishment of the system (Seong & Lee, 2004).

Looking from the benefits viewpoint, Croom and Brandon-Jones (2007) found positive implications and advantages of deploying information system in the public procurement processes, which improving communication and reducing administration costs were the major drivers. In addition, Gunasekaran and Ngai (2008) perceived e-procurement improved organizational and cost performance, competitiveness, strategic alliances and networking.

Public E-Procurement System Success

In its simplest definition, e-procurement system success is simply the benefits, values or consequences of the system implementation and use. Following Smith and Hirschheim (1999), these consequences can affect the aspects of management, organizations, social and economics, at the levels of application, firm, stakeholder, sector, and macro. In the public e-procurement systems studies, many dimensions were formulated to measure their success, either from the buyer perspective or the seller point of view.

Cost reduction, process efficiency and information quality have been widely studied as the main success criteria (Moe, 2004 ; Leipold et al., 2004 ; Panayiotou et al., 2004; Croom & Brandon-Jones, 2005 ; Hackney et al., 2007). Other success measurements included relationship development and process compliance (Croom & Brandon-Jones, 2005 ; Hackney et al., 2007). The rest were transparency, decision making, communication, economic benefits, service quality, trust and business value. Although there were diverse measures of success, there were still distinct measures that specifically relate to the context such as transparency and competitiveness. As such, the review of the success measures suggests dimensions that should be examined for this study must be according to the context, and carefully design as to reflect the goals of the system.

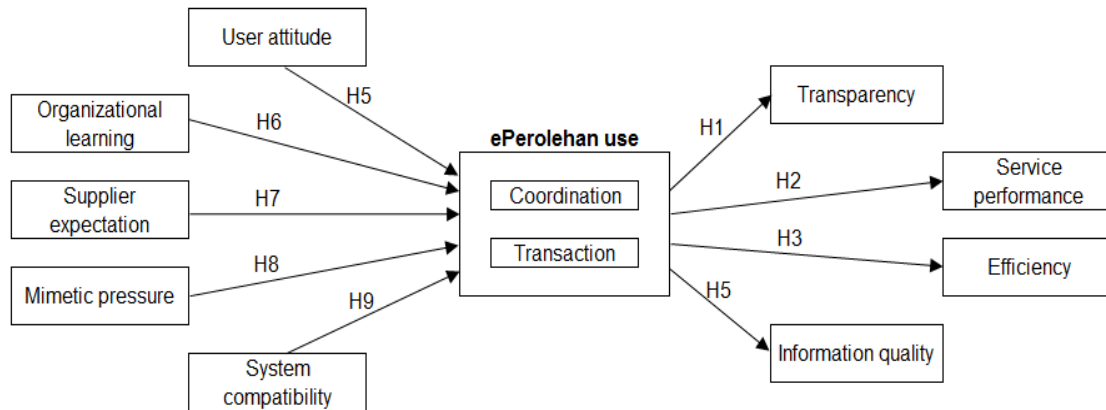
While there are many techniques and methods for evaluating e-government system success, the study in particular is based on the information system success model (Delone & McLean, 2003). Adopted from the communication theory that seeks to examine the influence level, Delone and McLean (1992) introduced the information system success model. The model captures six components that derive the success of an information system. There are information quality, system quality, use, user satisfaction, individual impacts and organizational impacts.

After two decades, the Delone-McLean model of information system success was revisited and revised. In the new model, Delone and McLean (2003) added service quality as an antecedent to use and user satisfaction. In addition, both individual impact and organizational impact of the former model were replaced with net benefits. It was assumed positive net benefits from the perspective of the owner or sponsor of the system will occur as a result of use and user satisfaction (Delone & McLean, 2003). Focusing on the effectiveness level, the information system success model is used as the foundation for evaluating the *ePerolehan* success and investigating the predictors among Malaysian government agencies as the buyers.

Malaysian Government e-Procurement System Success

The study evaluates the success of *ePerolehan* against the parameters of transparency, service performance, efficiency and information quality. In addition, five factors are predicted to influence the success, which are user attitude, organizational learning, supplier expectation, mimetic pressure and system compatibility. The theoretical framework of the study is shown in Figure 1.

Figure 1: Theoretical Framework and Hypotheses of the Study



Public e-Procurement system use and transparency

In general, two points of view describe transparency. First, transparency corresponds to the outcome measure of communication behavior. Second, transparency is also seen as an outcome of an exchange process between two or more entities (Street & Meister, 2004). In the meta-systems of governments and electronic markets, transparency is realized via information transfer and sharing of sensitive information that seeks to distribute or share the benefits of greater openness as widely as possible (Lamming, Caldwell, Harrison & Phillips, 2001).

Greater transparency can be achieved via information systems as several literatures recognize the important enabling role of IS in this situation (Street & Meister, 2004). In addition, transparency in the public sector will result from the simplified processes and the electronic support of the purchasing activities (Panayiotou, Gayialis, & Tatsiopoulou, 2004). In Italy, the public e-procurement system signals the existence of a wider array of opportunities for potential suppliers by reducing the power of invitation. Thus, it reflects the greater openness to market and transparency (Magrini, 2005). Hence, based on the discussion, the following hypothesis is offered:

H₁: The use of *ePerolehan* has a relationship with transparency.

Public e-Procurement system use and service performance

There are three distinct areas of service performance and quality in the public sector namely customer, professional and management (Agus, Barker & Kandampully, 2007). It is without doubt there are differences in the service quality uptake and performance between the private and public organizations. In private organizations, the service quality and performance concept and principals are adopted in a much faster rate. However, the process of adoption among in public agencies is rather slow due to difficulties in measuring the outcomes. Irrespective of the challenge, public sector organizations have come under increasing pressure to deliver quality services (Agus et al., 2007).

Hence strategies are taken to improve the service performance in the public sector. One of them is by adopting the technologies in the administration activities. The ability of a public sector to adopt new business models and information technology innovation is an essential indicator of its transformation success. Similarly, the information technology uptake to automate

the public procurement processes is seen as a strategy to improve the public sector service performance. Thus, the following hypothesis is offered:

H₂: The use of *ePerolehan* has a relationship with service performance.

Public e-Procurement system use and efficiency

Efficiency in this study is measured as process and cost efficiency. Synchronization of process is one of the fundamental objectives that entail the adaptation of information systems such as the e-procurement application. As public e-procurement system requires integration between government agencies and business organization, the data automation between and within organization allows the agencies to gain process efficiency. This is achieved via improved process management and reliable lead times (Saeed, Maholtra & Grover, 2005). In public e-procurement system research, Panayiotou et al., (2004) identify the benefits of process improvement as reduced paperwork, decreased redundancy and process and better documentation standardization.

Similarly, evidences of the relationship between information systems and cost efficiency can be traced in a large number of studies. For instance, the implementation of e-procurement system has improved the financial performance by internally reducing the transaction and process costs (Croom, 2005). Radhakrishnan, Zu and Grover (2008) assert the use of e-procurement has an effect towards the process capability through cost efficiency improvement. In addition, Panayiotou et al., (2004) conclude the simplified process and the electronic support lead to costs reduction of supply costs and costs per tender. Other public e-procurement system studies that have found a significant reduction of costs are Croom and Brandon-Jones (2007) via the dimension of costs of acquiring goods and services, and Mohd. Salleh et al., (2006) via the dimension of operational costs. However, it is important to note that process and cost efficiency are neither guaranteed upon the e-procurement implementation nor are they uniform across organization (Subramaniam & Shaw, 2004). Hence, based on the discussion, the following hypothesis is offered:

H₃: The use of *ePerolehan* has a relationship with efficiency.

Public e-Procurement system use and information quality

Information quality has also been assessed as a success measure in public e-procurement system as in Hackney, Jones, Losch (2007). The success of the information is in its ability in conveying the intended meaning from the perspective of the desired characteristics and the quality of the system such as accuracy, data format, meaningfulness, reliability and timelines (Delone & McLean, 1992). Similar to other information system applications, the public e-procurement system keeps data in data warehouse and provides meaningful information within seconds. In addition, the information will be more organized, well structured and properly managed. In the context of the study, the use of the system is predicted to improve the accuracy, completeness, correctness and consistency of information. Thus, the viewpoints lead to the following hypothesis:

H₄: The use of *ePerolehan* has a relationship with information quality.

User attitude and public e-procurement system use

The behavioral decision to adopt and use information technology is influenced by human attitude. Prior studies have found significant results of cognitive, affective and behavioral affection with the intention to use and actual use of information technology (Compeau, Higgins & Huff, 1999). One of the most important antecedents of information system usage is user attitude. Fishbein and Azjen (1975) view attitude as the affect that one feels against or for some object or behavior. Incorporating this aspect, Venkatesh, Morris, Davis and Davis (2003) describe user attitude as a user's affect, or liking, for information systems and for using them. Four related constructs of attitude have been defined which are attitude toward behavior, intrinsic motivation, affect toward use and affect.

Zooming into the definition of an attitude toward behavior, it is an individual's positive or negative feelings about performing the target behavior (Venkatesh, Morris, Davis, & Davis, 2003). Azjen (1991) also claims that attitude is a direct determinant of behavioral intention, which in turns affects behavior. The direct relationship between attitude and behavioral use has been studied by Sabherwal, Jeyaraj and Chowa (2006) and the relationship is found to be significant. Thus, the viewpoints lead to the following hypothesis:

H₅: User attitude has a relationship with the use of *ePerolehan*.

Organizational learning and public e-procurement system use

Many dimensions explain organizational capabilities as determinants of information system adoption by organizations. Deeter-Schmelz, Bizzari, Graham and Howdyshell (2001) conclude that organizational capabilities and organizational influences are significant motivators to the adoption of e-procurement. The extent to which e-procurement is adopted and used is strongly influenced by the general disposition of the organization as a whole (Croom & Brandon-Jones, 2007).

In this context, organizational learning is predicted to influence the government e-procurement system success. Organizational learning is defined as the firm capability to recognize external knowledge and information value, to assimilate and to apply them to commercial ends (Hung, Yang, Lien, & Kuo, 2010). An organization willingness to adopt a new innovation of information systems does not warrant a successful system implementation. Yet, it must be coupled with organizational capabilities to assimilate new innovations into organizational routines (Wu, Zsidisin & Ross, 2007). Soares-Aguiar and Palma-dos-Reis (2008) further add organizations require new learning processes and maintenance activities for using and managing an innovation such as an e-procurement system.

An important component of learning is the organization wide-sharing and dissemination of information. The adoption of e-procurement by its nature is a function-spanning task. As a result, a learning organization, characterized by high levels of cross-functional information dissemination and coordination is likely to be more successful in cooperating new e-procurement process (Wu et al., 2007). Hence, the viewpoints lead to the following hypothesis:

H₆: Organizational learning has a relationship with the use of *ePerolehan*.

Supplier expectation and public e-procurement system use

In public sector e-procurement system studies, environmental factors have been investigated as the predictors that affect the use. Aspects of external pressure, government, competition and customer interactions are among the dimensions studied (Kassim & Hussin, 2010a). One form of

institutional pressures is the normative pressure, for instance supplier expectation. As the government e-procurement system in an inter-organizational system, it requires participation from both the federal government agencies as buyers and businesses organizations as suppliers (Kassim & Hussin, 2010b). With this regard, having to confirm to suppliers expectations that government agencies use electronic system in their procurement process and management is found to be a significant determinant for the system use (Dooley & Purchase, 2006; Leipold et al., 2004). Based on the discussion, the following hypothesis is offered:

H₇: Supplier expectation has a relationship with the use of *ePerolehan*.

Mimetic pressure and public e-procurement system use

From the institutional perspective, an organization may adopt an innovation of information systems on the account of external pressures for the fear of being left behind (Wu et al., 2007). From the sociological perspective, organizations decision to engage in a particular behavior will depend on the perceived number of similar others that have done so (Soares-Aguiar & Palma-dos-Reis, 2008). These views share the notion that an organization may adopt an innovation not on the account of the innovation usefulness, rather because other similar organizations have done so.

This phenomenon is referred as “the bandwagon effect”. The bandwagon effect is found to be a determinant factor in e-procurement system adoption by organizations (Soares-Aguiar & Palma-dos-Reis, 2008; Wu et al., 2007). Besides, Dooley and Purchase (2006) also believe pressures to use e-procurement system from competitors or the related party will influence its adoption. Therefore, the discussion leads to this hypothesis:

H₈: Mimetic pressure has a relationship with the use of *ePerolehan*.

System compatibility and public e-procurement system use

Many aspects of technology and the innovation characteristics affect the usage of an information system. Information technology is the related hardware and software required to operate the information system. On the other hand, innovation characteristics are the relative attributes that describe the system, such as compatibility. System compatibility is the degree to which the innovation is consistent with potential user’s current practices and values (Rogers, 2003). Compatibility is also referred as the degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential users (Moore & Benbasat, 1991).

Studies of system compatibility and adoption perception or system use have found a significant relationship between the variables (Goodhue & Thompson, 1995; Norzaidi, Siong and Salwani, 2008; Thompson et al., 1991). Based on the discussion, the following hypothesis is offered:

H₉: System compatibility has a relationship with the use of *ePerolehan*.

RESEARCH DESIGN AND METHODS

The Instrument

A self-reposting questionnaire was used to collect data from the respondents. The instrument was divided into four sections to specifically address the nine hypotheses formulated in the study.

The first section consisted of items that captured the demographic characteristics of the organizations, such as number of employees, number of system users, number of years the system has been used and the annual procurement value. The remaining sections comprise of items on e-procurement system use (Wu et al., 2007), user attitude (Taylor & Todd, 1995), organizational learning (Wu et al., 2007), supplier expectation (Deeter-Schmelz et al., 2001), mimetic pressure (Wu et al., 2007), system compatibility (Moore & Benbasat, 1991), service performance (Agus et al., 2007), efficiency (Smart & Harrison, 2003; Zahay & Hanfield, 2004; Zhu & Kramer, 2005) and information quality (Wixom & Watson, 2003).

Data Collection Procedure

The data used to test the research model were obtained from a sample of federal government agencies. To increase the generalizability of the results, the participating agencies were selected from all ministries by applying the stratified random sampling. For simplicity, these public organizations are referred as government agencies. 550 questionnaires were randomly distributed and 284 responses were received, yielding a response rate of 51.64%. However, only 244 were used for the analysis, while the other 40 was discarded due to major incomplete answers.

The characteristics of the Malaysian federal government agencies as the respondents are shown in Table 1. The majority of the responding agencies are in the scale of moderate workforce size. Further, the size of the agencies corresponds with the number of system users and annual procurement value. The majority of the government agencies have been utilizing the system for three years or less. This may entail that implementation is an issue as the system is very complex and requires multiple integrations, especially to small and moderate size agencies.

Table 1: Characteristics of Agencies

Item	Characteristics	Percentage (%)
Number of employees	50 or less	23.0
	51 - 150	44.7
	151 - 500	21.7
	501 - 1000	7.2
	1001 or more	3.4
Number of <i>ePerolehan</i> users	5 or less	29.6
	6 - 8	41.2
	9 - 11	10.7
	11 or more	18.5
Number of years <i>ePerolehan</i> used	3 or less	74.1
	4 - 6	19.2
	7 or more	6.7
Annual Procurement Value (RM)	50,000 or less	10.6
	50,001 - 500,000	31.5
	500,001 - 1,000,000	17.0
	1,000,001 - 10,000,000	28.5
	10,000,001 - 100,000,000	11.9
	100,000,001 or more	0.4

In order to tackle the issue of non-response bias, two procedures were performed. First, a comparison was done on the acceptance of the responses with the potential respondents' distribution in the sampling frame. Second, a comparison was performed on the responses between early and late respondents. A chi-square test was conducted to compare the percentage of agency distribution and the returned responses. It was assumed there was no significant difference between the sampling distribution and returned percentage. The result indicated the response pattern reflected the sampling frame ($\chi^2 = 21.96$, $p = .462$), thus ruling out any bias in ministry distribution score.

The second procedure was performed by running an independent sample t-test to confirm there was no significant difference between the early and late responses. It was assumed those who returned the questionnaire after the first reminder have the characteristics of non-respondents. Hence, a comparison between the early respondents and late respondents was conducted. 79.5% of the returned survey were received within a month, and classified as early respondents ($n=194$). The other 20.5% returned the survey after the first reminder, and classified as late respondents ($n=50$). The result shows there was no significant difference between the means of all constructs across the two groups ($p > 0.10$ for all paired comparisons). Thus, it was concluded non-response bias did not pose a major problem for this study.

Assessing Validity and Reliability

Prior to the reliability test, a principal component analysis as a procedure of exploratory factor analysis was conducted. Table 2 depicts the results of the exploratory factor analysis. All items were loaded using the principal axis factoring and Varimax with Kaiser Normalization rotation. The results produced a total variance of 72.23%. The KMO of 0.935 indicated factor analysis was appropriate. The $MSA > 0.5$ suggested all variables should be included in the factor analysis, and the Bartlett's test is significant, implying the variables were correlated.

Table 2: Results of Exploratory Factor Analysis

Item	Factor	Value
Shorten the time taken to give feedback and information.	1	.720
Improve the services given to the suppliers.	1	.702
Reduce the time to solve supplier problems.	1	.591
Improve the quality of services.	1	.702
Provide suppliers with required products information.	2	.817
Search potential suppliers.	2	.634
Provide suppliers with specific information about product.	2	.888
Place and track orders with suppliers.	2	.627
Allow suppliers to directly participate in the system.	2	.732
Allow suppliers to view the quotations and tenders.	2	.695
Supplier selection criteria are available to all suppliers.	3	.718
Staffs know only the qualified business suppliers are awarded.	3	.705
Supplier selection criteria are available to all suppliers.	3	.732
Opportunities for more business suppliers to participate.	3	.749
Opportunities for more business suppliers to be selected.	3	.628
Information is more accurate.	4	.798
Information is more comprehensive.	4	.796

Information is more correct.	4	.841
Information is more consistent.	4	.822
Compress the processing time.	5	.651
Reduce paper-based manual efforts.	5	.731
Reduce human efforts.	5	.785
Reduce procurement operation costs.	5	.692
Reduce products and services costs.	5	.604
Reduce the costs of procurement coordination.	5	.661
Our agency is quick to learn about new technologies.	6	.799
Divisions, department and people in the agency exchange relevant information freely and frequently.	6	.621
The agency invests substantially in staff knowledge acquisition.	6	.685
Users like the idea of using the system.	7	.899
Users feel using the system would be a good idea.	7	.941
Users feel using the system would be pleasant.	7	.852

Further analyses on the instrument validity were performed to assess the convergent validity, composite reliability and discriminant validity. The instrument was also checked for its reliability. The results are displayed in Table 3. The cronbach's alpha scores indicated the questionnaire was reliable (Heir, Black, Babin & Anderson, 2010). Thus, the data can be used for further analyses.

Table 3: Cronbach's Alpha and Validity Assessment

Item	Cronbach's alpha	Variance extracted	Composite reliability
Use	0.857	0.671	0.908
Transparency	0.921	0.808	0.955
Service performance	0.960	0.860	0.961
Efficiency	0.907	0.799	0.908
Information quality	0.978	0.916	0.978
User attitude	0.952	0.877	0.955
Organizational learning	0.933	0.723	0.886
Supplier expectation	0.977	0.955	0.977
Mimetic pressure	0.826	0.700	0.851
System compatibility	0.903	0.888	0.923

Next, construct validation was employed for validating the instrument. The results of CFA and the structural model are depicted in Table 4. The data was analysed for Structural Equation Modeling by using the Analysis of Moment Structure (AMOS). SEM requires confirmatory factor analysis (CFA) or measurement model to be performed prior to assessing the structural model. The confirmatory factor analysis (CFA) yielded a result of chi-square/df = 1.206, CFI = 0.992 and RMSEA = 0.033. The structural model gave a result of chi-square/df = 1.189, CFI = 0.993 and RMSEA = 0.032.

Table 4: Goodness-of-fit Measures

Fit indices	Description	Recommended value	Measurement model	Structural model
Chi-square χ^2	χ^2 evaluates the fixed rather than the free parameters in a structural equation model.	≤ 3.00	1.206	1.189
Goodness-of-fit index (GFI)	Compares the fit function of the model to that of the null/independent model when all model parameters are zero.	≥ 0.90	0.911	0.877
Adjusted Goodness-of-fit index (AGFI)	Sample-based, parsimony-adjusted. Also analogous to corrected R^2 .	≥ 0.80	0.835	0.910
Comparative-fit-index (CFI)	Also known as the Bentler Comparative Fit Index. CFI compares the existing model fit with a null model which assumes the latent variables in the model are uncorrelated.	≥ 0.90	0.992	0.993
Root mean square error of approximation (RMSEA)	Approximates a noncentral chi-square distribution.	≤ 0.08	0.033	0.032

THE RESULTS

Structural equation modelling analyses were run to test the hypotheses. The results of the hypothesis testing are shown in Table 5. Referring to the table, all hypotheses were supported. The use of *ePerolehan* has proven that it promotes greater transparency, improves service performance, increases efficiency and provides more quality to the information ($\beta = 0.829$, $p < 0.001$), ($\beta = 0.935$, $p < 0.001$), ($\beta = 0.888$, $p < 0.001$) and ($\beta = 0.816$, $p < 0.001$). Hence, H1, H2, H3 and H4 were supported.

Table 5: Results of Hypothesis Testing

Hypothesis	Relationship	R ²	β	Sig.	Result
H1	Use and transparency	0.687	0.829	0.000	Supported
H2	Use and service performance	0.874	0.935	0.000	Supported
H3	Use and efficiency	0.789	0.888	0.000	Supported
H4	Use and information quality	0.666	0.816	0.000	Supported
H5	User attitude and use	0.568	0.372	0.000	Supported
H6	Organizational learning and use		0.352	0.000	Supported
H7	Supplier expectation and use		0.236	0.003	Supported
H8	Mimetic pressure and use		0.349	0.003	Supported
H9	System compatibility and use		0.501	0.000	Supported

The use of the system explains nearly 69% of the variance in transparency, 87% in service performance, 79% in efficiency and 67% in information quality. Thus, it can be concluded the highest success achievement is on the improvement of service performance, followed by efficiency, transparency and information quality.

Comparing to previous researches, the findings provide a significant quantitative support to the public e-procurement and its relation to transparency and efficiency case study by Panayiotou et al., (2004). Besides, the findings that suggest the use of the public e-procurement system relates to service performance and information quality are consistent with Leipold et al., (2004) and Hackney et al., (2007).

In addition, all of the determinants explain about 57% of the variance in the use of *ePerolehan*. The results also show user attitude has a direct influence to *ePerolehan* use ($\beta = 0.372$, $p < 0.001$). Thus, H5 was supported. We also found evidences that there are significant relationships between organizational learning and *ePerolehan* use ($\beta = 0.352$, $p < 0.001$) and also between supplier expectation and *ePerolehan* use ($\beta = 0.236$, $p = 0.003$). Therefore, H6 and H7 were supported. For the effect of mimetic pressure and system compatibility on *ePerolehan* use, the results show both have direct impacts ($\beta = 0.349$, $p = 0.003$) and ($\beta = 0.501$, $p < 0.001$). Therefore H8 and H9 were supported.

DISCUSSION AND RECOMMENDATION

The main objective of this research is to investigate the level of Malaysian government *ePerolehan* system success and the factors that contribute to this success as perceived by the government users. In predicting the success of the public e-procurement system, this study has found the electronic conduct contributes to the improvement in the service performance, efficiency, transparency and information quality. As a result, there are evidences that the reformation of the public procurement through the technological integration has provided significant impacts not only to the federal government agencies, but also to the overall functions of the public sector. Therefore, the success verifies *ePerolehan* is essential in transforming the public services and it adds to the present achievements of e-government initiatives in Malaysia.

Fast responses to business suppliers' uncertainties and better procurement services as a result of quick access to information are the essential element in transforming the image of the federal government agencies. A common criticism of these agencies has been the poor services, which has a tremendous influence on public perceptions including supplier organizations on the service performance. However, with the use of the public e-procurement system, the responses indicate more than 85% variance in the service performance, which signify how the federal government agencies perceive the system has been able to improve their services to the business suppliers tremendously.

Next, the derivation of efficiency has shown reduction of human efforts, decrease of unnecessary 'red-tape' practices and lessening of processing time as the main characteristics that make the procurement processes more efficient. Thus, the process improvement is imperative in reducing the bureaucratic procedures. Besides, the automation system has also resulted in the cost saving by reducing the operation, products and services costs.

Subsequently, a high level of variance in transparency has also been explained by the use of the public e-procurement system. Achieving a greater transparency is essential as the possibility of supplier organizations to access online information about new business opportunities reduces the "power of invitation", which Magrini (2005) refers as public officials who decide which enterprises to invite to the tender and try to keep the secret as long as possible. Moreover, an increase in the number of overall competition among supplier organizations, although cannot per se point to reduced corruption, certainly signals for the existence of more opportunities for potential suppliers (Magrini, 2005).

Overall, the use of *ePerolehan* as the Malaysian public e-procurement system has successfully derived the effectiveness via specific, yet important measurements. In fact, the use of the Malaysian public e-procurement system has proven the realization of the initial goals which are to reduce transparency, to have an economical system through efficient processes and lower costs and also to have a system that is accessible at any time. Therefore, it is clear that the empirical findings do not only signify for the worth for the multi-million dollar information technology investment, but also offer a better perspective concerning the Malaysian federal government agencies and the new system of public procurement.

Moreover, the study has found the significant predictors of the public e-procurement system use, which based on the level of strength, are system compatibility, user attitude, organizational learning, mimetic pressure and supplier expectation. System compatibility in the forms of matches between procurement work and system functionality, between users' work style and system ability are the most fundamental elements that determine the use among the agencies. It is without doubt for any information system environment, there must be a consistency between the functions and design of the system with potential users' current practices and values (Rogers, 2003).

The second predictor which is user attitude has always been found to have a strong, direct and positive effect with behaviour (Dabholkar & Bagozzi, 2002). Whereas the link between attitude and behaviour is fundamental in attitudinal research and has been supported in a wide variety of settings, the attitude is still significant in determining the public e-procurement system use among the agencies. This can be explained by feelings of the top management as one of the users, and the perceptions from other users on the system that are accumulated to form a cumulative decision that either accelerate or hold up the use decision.

Similarly, the organizational learning pace is another critical element that derives the system use. The development of the organizational learning starts from the individual through the complete organization and is embedded in the organization's structure. Organizational learning depends on clear organizational goals, a culture of sharing and a connection among organizational subsystems, structure and culture to achieve learning results (Hung et al., 2010). Hence, it can be concluded learning and competence provide the foundation for Malaysian government agencies to improve their core competencies in the attempt to manage changes.

Finally, the expectation from the suppliers also determines the use level among the government agencies. High capability suppliers may indicate to the agencies that public organizations use the e-procurement system for a win-win situation. If the government agencies fail to implement and use the system successfully, it gives a negative impact to the supplier organizations as the failure will probably decrease their chances and opportunities to engage in business activities with the public sector. The following table summarizes the key recommendations for decision makers.

Table 6: Key Recommendation

Aspect	Recommendation
System compatibility	The most fundamental element that determines the use of the system. Decision makers should ensure a high level of consistency between the functions and design of the system with potential users' current practices and values.
User attitude	Signals for the management to be more responsive to the opinion and perception of the employees as the system users. The management of the agency must be wise enough to balance the feelings of the users towards the system with the federal regulatory policy.

Aspect	Recommendation
Organizational learning	As the development of the organizational learning starts from the individual through the complete organization, more investment should be devoted for employee knowledge requisition. The process will then encourage for the creation of knowledge workers, which are the fundamental aspect for improving the organizational core competency, even for the public sector.
Mimetic pressure	Decision makers must ensure federal government agencies are more competitive and be able to respond to challenges.
Supplier expectation	Although the important association between the agencies and suppliers may have received very little attention, the linkage has become clearer and significant. Thus, decision makers must ensure for a higher level of readiness and acceptance among the suppliers as it takes both the demand and the supply side to work in equilibrium for the system to be used successfully.

In sum, the findings have opened a new perspective of the public procurement success and the general linkages of factors from various angles. The overall model is significant in understanding how system compatibility, user attitude, organizational learning, supplier expectation, together with mimetic pressure explain the success of the Malaysian public e-procurement system; a baseline on how they relate to the Malaysian e-government initiatives and the transformation of the public administration towards a new agenda.

However, the findings of the present study cannot be interpreted as an absolute procurement success since the responses were gathered only from the buyer perspective. Thus, in achieving the overall value, future studies should be designed for examining the success from the viewpoints of the supplier. Yet, the research should be carefully designed to enable for a common success measurement.

CONCLUSION

The opportunities offered by the information and communication technologies have revolutionized the Malaysian government interaction with the business organizations. Utilizing the ICTs, the public procurement process has been transformed into modules that have been hoped to seamlessly integrate the procurement operation between the federal government agencies and supplier organizations.

Although studies on Malaysian public e-procurement system were conducted, attempt to understand and evaluate the e-procurement success is lacking. Therefore the study reduces the gap by empirically examines and evaluates the success against the primary objectives and mission which are to improve transparency, to provide a more economical operation and to offer a user friendly system. Through various theoretical conceptualizations, the study provides some views of the achievement and its use across federal government agencies.

In essence, the findings have added to the body of knowledge, overcome the limitations of previous research and the framework could be adapted to evaluate other e-government initiatives as a strategy for verifying the nation's vision.

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