A Measurement Model of Information Sharing in E-Government Services: A Case Study of Kedah, Malaysia

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ABSTRACT

In order to provide a better delivery of e-government services, guides should be given to support information sharing and integration. Good practices in information sharing among state government agencies should be adopted. In present Malaysia, there is insufficient information regarding the current practices, states or levels of maturity, requirements, and models adopted in relation to information sharing for the e-services' implementation among government agencies. Previous studies in Malaysia have been conducted in relation to critical factors for e-government services and information sharing. These previous studies focused on a conceptual framework that requires more efforts in creating an integrative model to guide information sharing for e-government services. The main aim of this study is to propose a measurement model of information sharing model to support the implementation of e-government services for Malaysian and Indonesian environments. A set of questionnaire has been distributed to a sample of private sectors that are using e-government services or e-procurement in conducting their purchasing process. The analysis of the data was carried out using Structural Equation Modeling (SEM) and Partial Least Square (PLS) techniques to examine the relationships between the identified factors which were grounded on the D&M IS Success Model. The outputs are also expected to formulate guidelines and procedures to best guide the information sharing framework to support the implementation of e-government services in Malaysia and Indonesia.

Keywords: Information sharing, e-government, e-procurement.

I   INTRODUCTION

Nowadays, the electronic procedures of governments and business establishments are growing rapidly with technological innovation. Electronic government (e-government) has been gathering momentum in the research area and applied in some organisations in this global era, contributing beneficial information to enhance government services to business organisations through the expected quality operations. E-government implementations contribute several positive impacts in criteria such as service quality, data analysis, and management control (Hassan et al., 2015). In addition, information sharing has been applied in many areas such as business, government, and non-profit organisations that are concerned with and have tried to resolve social and environmental problems (Mohammed et al., 2012).

This paper attempts to describe a measurement model and its determinants of the success of e-government implementation among the government agencies in Malaysia in the context of information sharing through the lens of DeLone and McLean IS Success Model (DeLone & McLean, 2003). The next section of this paper explains the research context and conceptual model in pertinence to the existing literature on information sharing in e-government services. This section is followed by an explanation of the research method used and an evaluation of measures, specifically the construct validity, convergent validity, discriminant validity, and reliability of the constructs. The subsequent sections describe the data analysis, path analysis, and hypotheses testing. The last section focuses on discussion and conclusion with suggestions for future research.

II   RESEARCH CONTEXT AND CONCEPTUAL MODEL

Technology is capable of changing government organisational structures and business processes and, if used properly, of constructing considerable organisational, technical, and business benefits. Moreover, information sharing is a comparatively new category of IT inventiveness; it comprises building systems, establishes formal standards, and changes business processes to allow industries to share data and information with several industries (Garcia, Smith, & Duchesi, 2007) This section presents the elaboration on e-government services that are classified into several categories with the focus on e-procurement implementation. It also discusses information sharing implementation, model, and services in various applications.

A. E-Government Services in Malaysia and Indonesia

Electronic government or also known as e-government embraces the use of information and communications technology (ICT) to provide a convenient channel and enhance the accessibility of services among government agencies (G2G), between government and citizens (G2C), between government and businesses (G2B), and other transformation via networks (Carter & Belanger, 2005; Suha & Anne, 2008; Alhabshi, 2009). It is also one of the platforms of transition from conventional 'brick and mortar' services to modern online services (Carter & Belanger, 2005; Dinoroy, 2017).

Malaysia started the e-government services back in the 1990s where Multimedia Super Corridor Malaysia (MSC Malaysia) was established in 1996 as a platform to build a competitive group of local ICT companies and industries. It was envisaged to build collaboration among people in the government agencies, businesses, and citizens to work together to improve productivity using ICT technologies to transform the government's method of operation, coordination, and enforcement (Kaliannan, Awang, & Raman, 2007).

MyGovernment portal, for instance, serves as a one-stop platform of the Malaysian government's official gateway https://www.malaysia.gov.my/public/cms/). Many other e-government services such as e-Perolehan, e-Tender, Sistem MyGST, Semakan Bayaran Kontraktor, and many more are accessible via this portal. Another successful e-government service is the MyEG application, which serves as an electronic channel in delivering services from several government agencies to Malaysian citizens and businesses (https://www.myeg.com.my).

E-government in Indonesia started to flap its wing in 2001 as initiated by the Presidential Instruction No. 6/2001, which accentuated the government agencies to apply Telecommunication, Media, and Information in supporting government services (Ritchi et al., 2016; Jacob, 2017). To date, most local government agencies have started the development of e-government notion in their service implementation (Dinoroy, 2017). However, the implementation is still considered early in its level of e-government maturity with only a small number of e-government services that have furthered to the higher level such as Sistem Informasi Manajemen Satu Atap or also known as SIMTAP (Prahono & Elidjen, 2015).

B. Information Sharing in E-government

Information sharing in e-government generally refers to a way of communication between the government, citizens, and businesses in delivering its services using the ICT (Wang & Lei, 2013; Yang & Wu, 2014). Different types of information can be shared through e-government including sensitive and confidential data among agencies as there is no standard method in information sharing for e-government services (Makedon, Sudborough, Baiter, Pantziou & Conalis-Kontos, 2015)

The ability to share information across government agencies is identified as one of the main components in information sharing in e-government services as suggested by Pardo (Makedon et al., 2015) A research was conducted to implement the geological hazard of spatial information sharing through web-based services by enabling information sharing via cloud computing in the province of Sichuan, China. The information sharing comprises shared content, objects, and channels among government agencies, citizens, and businesses (Wang & Lei, 2013).

C. Information Sharing in e-procurement

Electronic procurement or e-procurement is generally referring to products or services purchasing process using electronic mediums over the Internet that can lead to significant reduction in purchasing costs and time (Tatoglu et al., 2016). Electronic Data Interchange (EDI) has been supporting the automation of procuring transactions since the 1960s, followed by Enterprise Resource Planning (ERP) in the 1970s. Websites became widely used in the 1990s and provided the important medium for online procurement systems (Mose, Njihia & Magutu, 2013).

The essential features of e-procurement process are purchasing systems, electronic tendering, catalogue-based system, electronic marketplace, and online auctions (Mose et al., 2013). Alkhalifah and Ansari claimed that adopting e-procurement can contribute to some benefits including reductions in management costs, purchasing prices, and order-cycle time, improving support from providers, and enhancing the performance (AlKhalifah & Ansari, 2016).

Prior researches have examined the long-term implications of this organisation-vendor relationship. Evidently, the findings indicated that mutual trust and respect between organisations and vendors resulted in greater information sharing which also contributed in cost reduction as well as organisations' performance enhancement (De Toni & Nassimbeni, 1999; Klein et al., 2007; Zunk et al., 2014; Kim et al., 2015).

A research was conducted by Ramantoko and Irawan to examine the factors influencing the information sharing model in supporting the implementation of e-procurement system in e-government services in Bandung, Indonesia (Ramantoko & Irawan, 2017). The assessment was carried out for the early maturity of information sharing stage or stage 1 to evaluate the benefits and risks of implementing the system in the early stage by adopting the D&M IS Success Model. The positive outcomes indicated that all constructs of the D&M IS Success Model positively influenced the IS model in supporting the implementation of e-Procurement services between the government agencies and the citizens of Bandung.

In Malaysia, e-Perolehan is one of the most successfully implemented e-procurement systems. This system is a transition from conventional manual procurement transactions to an online-based procurement system (Kaliannan et al., 2007). E-Perolehan entails government agencies and businesses (G2B) relationship. The overall transactions from quotation submission, purchase orders, payment, to product/service delivery are done and monitored electronically. This system also provides online registration application between suppliers and the Ministry of Finance (MoF). The application submission, application status checking, and registration fees payment can all be done via e-Perolehan.

D. DeLone and McLean Information Sharing Success Model

This research is grounded on the DeLone and McLean IS Success Model to measure the IS success of the e-government services as suggested by Jafari et al. (2011). DeLone and McLane information system is a framework for conceptualising and operationalising IS success. Most researchers referred to the framework as guidance in the implementation of information system, particularly in relation to the area of information sharing. The D&M IS Success Model suggests success measures consisting of three quality dimensions (Information Quality, System Quality, and Service Quality), Intention to Use or Use, User Satisfaction, and Net Benefits.

According to DeLone and McLean, Net Benefits is the most crucial IS success measure which is determined by carefully defined context and stakeholders. The results of intention to use and user satisfaction lead to the occurrences of net benefits, whether the benefits have positive or negative overall impacts on users. Positive benefits will most likely lead to the continuation of the services and negative benefits will most likely lead to the discontinuation of the services. Figure 1 depicts the proposed model based on the D&M IS Success Model.
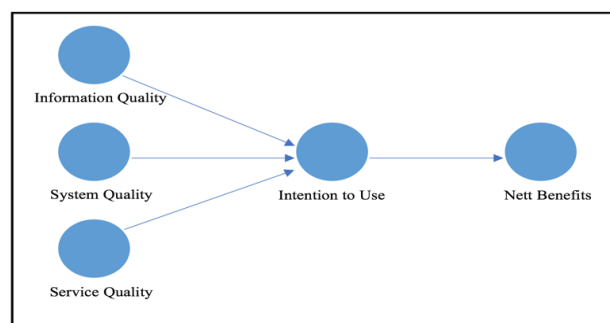

Figure 1. Proposed Model.

III RESEARCH METHODOLOGY

The study first identified the list of all criteria of the IS Success Model that was involved in the e-government and e-procurement in Malaysia. This study stresses on the review of the DeLone and McLean IS Success Model. From the review, five important criteria have been identified that support online purchasing system. The criteria are System Quality (SYSQ), Information Quality (IQ), Service Quality (SQ), System Use (IU), and Net Benefit (NB).

As the case study approach was chosen, a few e-government services and state agencies were selected for the study, based on the status of the importance, performance, and richness of data. Questionnaires were designed and distributed to a number of private companies in Malaysia that are using e-procurement service.

A discussion was made with the selected private companies to collect data. The questionnaires were distributed through email to all the selected companies. 56 respondents answered the survey completely.

From the questionnaires, the data was then analysed using the SPSS software to calculate the Cronbach's alpha values for the constructs. A research model grounded on D&M IS Success Model was developed by utilizing the Structural Equation Modeling (SEM) and Partial Least Square (PLS) techniques.

IV RESEARCH FINDINGS

A. Measurement Model – Reliability and Validity

The first step in PLS analysis is to analyse the Measurement Model (outer model) to determine how well the indicators (specific questions) load on the theoretically defined constructs. Examining the outer model ensures that the survey items are measuring the constructs they were designed to measure, thus ensuring that the survey instrument is

reliable. To determine individual item reliabilities, the researcher looked at their loadings to their respective constructs.

Table 1 presents the item loadings and weights obtained from the model. The weights and loadings for all five constructs were examined, and all 19 items had loadings of 0.60 or higher.

Table 1. Loadings and Cross Loadings

Construct	IQ	IU	NB	SQ	SYSQ
IQ1	**0.874**	0.615	0.480	0.514	0.728
IQ2	**0.869**	0.669	0.479	0.583	0.488
IQ3	**0.788**	0.475	0.352	0.553	0.370
IQ4	**0.740**	0.543	0.475	0.452	0.694
IU1	0.510	**0.745**	0.554	0.415	0.583
IU2	0.608	**0.792**	0.510	0.531	0.456
IU3	0.570	**0.860**	0.619	0.658	0.398
IU4	0.609	**0.834**	0.640	0.725	0.365
NB1	0.540	0.737	**0.932**	0.590	0.460
NB2	0.436	0.593	**0.904**	0.522	0.305
NB3	0.420	0.525	**0.818**	0.552	0.303
NB4	0.511	0.644	**0.846**	0.556	0.451
SQ1	0.425	0.412	0.285	**0.662**	0.287
SQ2	0.335	0.431	0.405	**0.697**	0.111
SQ3	0.638	0.704	0.581	**0.825**	0.368
SQ4	0.424	0.533	0.530	**0.748**	0.447
SYSQ	0.624	0.510	0.392	0.360	**0.926**
SYSQ	0.550	0.371	0.249	0.244	**0.846**
SYSQ	0.688	0.555	0.501	0.501	**0.911**

B. Convergent Validity

Convergent validity was carried out based on factor loadings, composite reliability, and average variance extracted (AVE) (Hair, Anderson, Tatham & Black, 2006). The loadings for all items exceeded the recommended value of 0.5 (Hair et al., 2006). All constructs ranged from 0.824 to 0.930, which exceeded the recommended value of 0.8 (Chin, 1998). The AVE ranged from 0.541 to 0.801. Table 2 depicts the results of the measurement model.

Table 2. Measurement Model Results

Construct	No of Items	CR	AVE
IU	4	0.883	0.672
IQ	4	0.891	0.654
NB	4	0.930	0.768
SQ	4	0.824	0.541
SYSQ	3	0.924	0.801

C. Discriminant Validity

Discriminant validity test guarantees a construct is independent and distinguished among other constructs by assessing the correlations between the constructs (Hair et al., 2006). The values of discriminant validity of all constructs are shown in Table 4 the values in bold represent the AVE while the other values represent the squared correlations.

Table 3. Discriminant Validity for Model

	IU	IQ	NB	SQ	SYSQ
IU	**0.820**				
IQ	0.710	**0.809**			
NB	0.549	0.721	**0.876**		
SQ	0.641	0.731	0.633	**0.736**	
SYSQ	0.700	0.546	0.441	0.428	**0.895**

V CONCLUSION

This paper examines the measurement model of information sharing in supporting the implementation of e-government services and e-procurement in Malaysia. Additionally, a research model was developed grounded on DeLone and McLean IS Success Model with 5 constructs namely Information Quality, System Quality, Service Quality, Intention to Use and Net Benefits and 19 indicators in total. The model was analysed through PLS to run the measurement test. It is conducted to evaluate the reliability and validity of the constructs and indicators.

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