A Conceptual Model of Information Sharing in E-Government Services

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Abstract—As 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 the state government's agencies should be adopted. In Malaysia, currently, there is insufficient information about the current practices, states or level of maturity, requirements, models adopted in relation to information sharing for the e-services' implementation among the 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 conceptual framework which need for more efforts in creating an integrative model to guide information sharing for e-government services. The primary aim of this study is to propose information sharing model to support implementation of e-government for Malaysia and Indonesia environment. A theoretical study is conducted to analyze several prominent information sharing models to identify the appropriate information sharing practices in delivering e-government services. Case studies will be applied to explore the current practices and the state of maturity level of information sharing at inter-organizational level among the states. In-depth interviews to public-sector participants will be carried out based on the best practices. Government documents will also be reviewed to learn the agencies' vision, mission, objectives and others. The findings will be used as a foundation. These outputs are also expected to formulate guidelines and procedure to best guide information sharing framework to support an implementation of e-government services in Malaysia and Indonesia.

Index Terms—E-Government Services; E-Procurement; Information Sharing.

I. INTRODUCTION

Nowadays, the electronic procedures of government and business establishments are growing promptly with technological innovation. Electronic Government (E-Government) has been gathering momentum in study and apply in some organization global era. It is the contributions and benefits of Information to enhance the government services to business organizations through the expected quality operations. E-Government implementations contribute several positive impacts in any criteria such as service quality, data analysis and management control [1].

The focus of this study is information sharing in e-Government. Information sharing has been recognized in many areas such as; business, government and Non-profit organizations that concerns and tried to resolve social and environmental problems [2].

This study emphasizes on the information sharing that are available to public, in terms of the details of how government agencies in Malaysia practice information sharing in delivering E-government services to public. It is guided using a framework for measuring the complex dependent variables named DeLone and McLean Information Systems (IS) Success Model.

The study aims to identify information sharing requirements among the state government agencies in implementing e-Government services, to identify the practices and stages of information sharing among the state agencies in implementing e-Government services and to propose an information sharing model in supporting e-government implementation among government agencies. This study also attempts to find answers to the following questions - (RQ1) What are the requirements of information sharing among the state government agencies in implementing e-Government services? (RQ2) What are the practices and stages of information sharing among the state agencies in implementing e-Government services? (RQ3) What is information sharing model in supporting e-government implementation among government agencies?

II. RESEARCH MOTIVATION

Norazah and Juhana had examined factors in influencing employees in knowledge sharing within E-Government agencies in Malaysia [3]. They proposed an integrated conceptual framework that highlighted two capable factors; technical factor and non-technical factor. These studies, although, based only on the literatures and experts review without engaging any government agencies in the data collection process, could provide a good foundation in the future study of proposing information sharing model for the government agencies.

A study revealed that implementing e-Procurement in government agencies has its own shortcomings and challenges such as lack of IT skills and infrastructures, problems in software integration, data management, legislation as well as outsourcing constraints [4]. Nawi, Roslan, Salleh, Zulhumadi, & Harun (2016) also examined the challenges of e-Procurement implementation among the government agencies in Malaysia [5]. They have discovered that there were constraints in government policies which requires tendering and purchasing processes to be in printed forms (paper-based) and does not provide the flexibility for the process to be carried out in the electronic forms via web-based application (e-tendering system). Due to this obstacle, it hinders the attempt to establish the e-Government services. External challenge is also identified to this matter. Moreover, challenges from the vendors, industry and technology enhancement are also identified as external challenges that set the implementation of e-Government services aback from

establishment. These challenges are beyond the control of the organizations [5].

The requirements for e-government services, what and how much information can be shared are still warrants for further investigation. The confidentiality and even security of the information for information sharing to take place among government agencies is very crucial. Three categories of security in relation to e-government services are highlighted including data security, information security, and process security; in which they are categorized under organizational and technological factors.

This study focuses on implementation and survey regarding information sharing model. It consists types of E-government service, E-Procurement DeLone and McLean and parameter measurement: (i) *E-Government Service* - deliberating the E-Government service that form of information sharing in the form of model and specification, (ii) *E-Procurement in Malaysia and Indonesia Agencies* – to focus on a survey in any agencies in Malaysia and Indonesia that are using system of E-procurement system in their environment.

III. BACKGROUND OF STUDY

This section presents the elaboration about E-government services that are classified into several categories the focus in l E-procurement implementation. It also discussed about information sharing implementation, model and services in the various application.

A. E-Government Services

E-government is the use of information knowledge to allow and enhance the efficiency with which government services are provided to citizens, workers, and agencies [6]. It refers to government's use of technology, predominantly web-based Internet tenders to improve the access to and transfer of government data and provision to populations, corporate partners, employees, other agencies, and government entities. It is used to assist public administrators of traditional administrative organizations. This article describes different stages of e-government development, which outline the structural transformations of governments' progress toward electronically-enabled government and how the Internet-based government models become integrated with traditional public administration, inferring essential deviations in the form of government [7].

E-Government services connect government networks and organize a variety of service infrastructure to deliver extensive and proactive services. The e-Government services are insufficient owing to two major problems. First, previous studies on information systems implementation and recognition focus on business and for income organizations, not on governmental and public organizations. Second, despite most of studies on enhancing E-government services have been proposed, useful empirical study is deficient. E-government is more than online service delivery system. Behavioral issues of e-government study are noticeably more significant than technological ones. Moreover, e-government services are required to support governments in improving the usefulness and quality of e-government services [8]. There are several study efforts that implemented the E-government services.

Sidorof and Hyvonen (2005) proposed the E-government in form of portal system that used for semantic search to solve problem of discovery and aggregation content in the portal [9]. It uses connecting in terms of semantic web ontologies and logic instructions is flexible from the system structure viewpoint, can be used to deliver the end-user with useful semantic services, and can reduce human effort in portal maintenance.

Aman and Kasimin (2010) evaluated the E-government services in Malaysia to enhance the access to and supply of government services to benefit citizens, business companies to inefficient or ineffective due to many challenges encountered in determining the benefits cost [4]. The evaluation E-government also able to adopt the project E-procurement that increases the quality of service it delivers and converts traditional manual procurement processes to electronic procurement on the Internet. E-procurement focus in administration fees in company that allows suppliers to register or renew their registration with the Ministry of Finance through the Internet. Suppliers are able to submit application, check application rank and pay registration fees through E-procurement.

Then, Garcia, Smith and Duchessi (2007) used collaborative E-government to control and manage the perceived impediments and benefit the information sharing public in several sectors in government environment [10]. The proposed collaborative system achieved the expected output that reduced duplicate data process, better quality information and effective any service government. Next section elaborates the information sharing that collaborative with E-government implementation.

B. Information Sharing

Information sharing is generally referred to ways of communication between senders and receivers [11]. There are a few information sharing models that were developed by previous researchers. Abdelhadi et al. (2015) proposed information sharing model to develop business management using cloud technology [12]. The model offers two variants in the cloud technology which are managed and unmanaged private cloud. Managed private cloud is flexible, secure cloud hosting services and compelling for all businesses alike. Meanwhile, the unmanaged private cloud provides users with similar features as managed private cloud but with the only exclusion being managed services.

Bijon, Haque and Hasan (2014) proposed Mobile Ad hoc network (MANET) based on the implementation of information sharing model [13]. This model analyzed circulation situation for approval flows and minimized it using 'buffering on-the-fly' technique. The information model upgrades in specific model name behavioral model that identifies various valuable properties that influences trust calculation in universal environment and delivers a supple device by which a node can compute trust prioritizing these properties based on its requirements.

Wang and Lei (2013) implemented platform information sharing model on geo-hazard spatial based on service oriented architecture (SOA) for geological disaster data services [11]. Data for the application of SOA assist reusable application service or utility of distinct development of integration, and expected through the network admission to these services or functions. The service framework that is modified to Wenchuan zone by using data set rules, geo-shared service model by Geo-Hazard Spatial Information. Information Sharing Service Model is evaluation and application as well as effective system test is finished based

on the Wenchuan geo-disaster evaluation and application system and shared service stage design.

Yingzhao and Jing (2009) developed the information sharing approach for supply chain management to the market competitions are so intensified [14]. The supply chain partnership entails intensive but selective information sharing and joint improvement activities. Information sharing is illustrious between purchasing information sharing and buyer shares tactical information.

C. Information Sharing

Electronic procurement or e-procurement is generally referring to products or services purchasing process using electronic mediums over the Internet which can lead to significant reduction in purchasing costs and time [15] [16] [17]. The main features of E-procurement process are desktop purchasing systems, electronic tendering, catalogue-based, online auctions and systems. There are three components that make up the implementation of E-procurement system as illustrated in Figure 1.
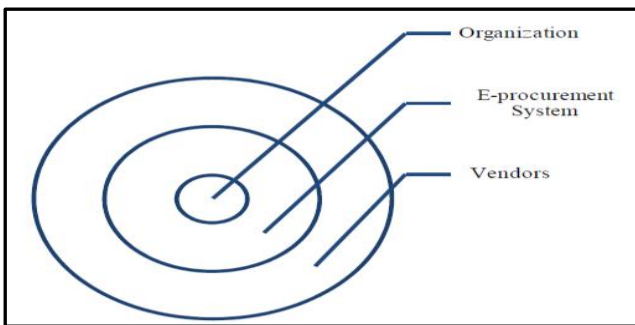

Figure 1: E-procurement system [16]

Based on Figure 1, E-Procurement system controls the procurement process electronically which is very helpful for the vendors and the organization. Prior researches have examined the long-term implications of this organization-vendor relationship. Evidently, the findings indicated that mutual trust and respect between organizations and vendors resulted in a greater information sharing which also contributed in cost reduction as well as organizations' performance enhancement [18] [19] [20] [21].

A research was conducted by Ramantoko and Irawan to examine the factors influencing the information sharing model in supporting the implementation of e-Procurement services in e-Government services in Bandung, Indonesia [8]. 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 D&M IS Success Model. The positive outcomes indicated that all constructs of 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.

IV. METHODOLOGY

This section explains the phases of research methodology designed for this study. Figure 2 describes the concept and technique used to reach the objectives of the study. The study first identifies the list all the E-Government services offered and delivered by the state agencies to government agencies, citizens and businesses.
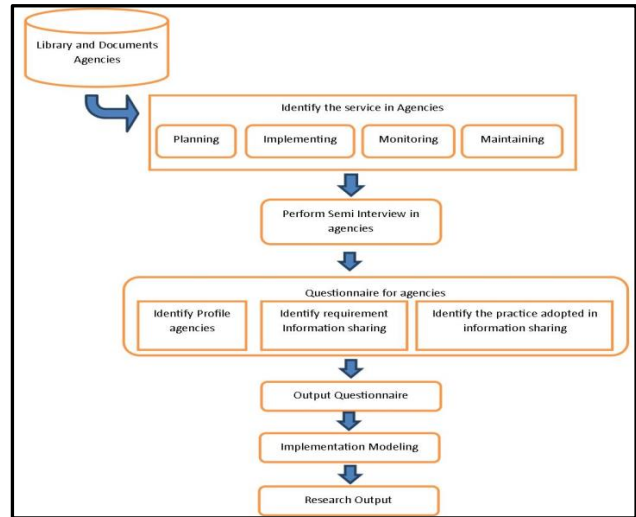

Figure 2: Implementation research methodology

This study stresses on library search and documents review on e-Government services in Malaysia and Indonesia. A visit to MAMPU and MDEC of Malaysia and the related agencies in Indonesia will be among the mechanisms to confirm with the list and status of e-Government services, as well as to gather some documents in relation to e-Government rules/policies/framework. The list of these e-Government services will advance the study to the list of the state agency/s that directly and indirectly involved in the planning, implementing, monitoring and maintaining of the services.

As case study approach is chosen, a few e-Government services and state agencies will be selected for the study, based on the status of the importance, performance, and richness of data. A semi-structured interview will be performed on public-sector participants including the agency's leaders, head of department and program manager. This is to identify the requirements in information sharing for implementing e-Government services. Questionnaires will be designed based on previous studies and documents gathered from MAMPU, MDEC, and Chief Government Security Office (CGSO). The first part of the Questionnaires is about the profile of the agency and e-Government service. The second part will be about the requirements of information sharing that could include items of technical and non-technical factors needed in facilitating the sharing of information between agencies and/or among agencies in a state.

The third part of the questionnaires is about the practices adopted in information sharing between and among agencies. This would include questions about dimension and maturity stages of IS. The areas will reveal the type or dimension focused by the state's agencies; either at technological, organizational, inter-organizational or environmental.

Semi-structured interviews would be carried-out to probe more on the details of the practices especially when involve conflicts between agencies in information sharing. It will be part of the focus in the study to identify the alignment of the practices by the State to the guidelines given by the Federal. Data will be analyzed qualitatively and will be validated by the selected experts. The output would highlight the current practices adopted or the gaps to be filled in for an improvement. Based on the data gathered, a model for information sharing for an implementation of e-Government

services among the state agencies will be proposed. It is expected that the proposed model can significantly guide and enhance information sharing between and among the state agencies in implementing e-Government services at state level in the future.

V. CONCEPTUAL 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 Jaffari et al. (2011) [22] [23]. DeLone and McLane information system is a framework for conceptualizing and operationalizing IS success. Most of researchers referred the framework as guidance in implementation of information system particularly in relation to the area of information sharing.

D&M IS Success Model suggesting success measures which consists of three quality dimensions (Information Quality, System Quality and Service Quality), Intention to Use or Use, User Satisfaction and Nett Benefits as depicted in Figure 3.
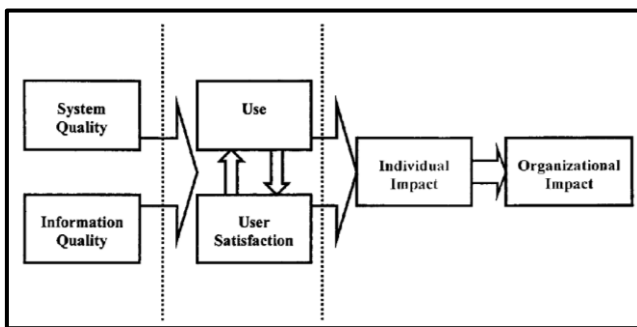

Figure 3: DeLone and McLean IS Success Model (DeLone & McLean, 2003) [22]

Per DeLone and McLean, Nett Benefits is the most crucial IS success measure which is determined by carefully defined context and stakeholders [22]. The results of intention to use and user satisfaction lead to the occurrences of nett benefits whether the benefits have positive or negative overall impacts on users. Positive benefits most likely will lead to the continuation of the services and negative benefits most likely will lead to the discontinuation of the services. Figure 4 depicts the conceptual model based on the D&M IS Success Model.
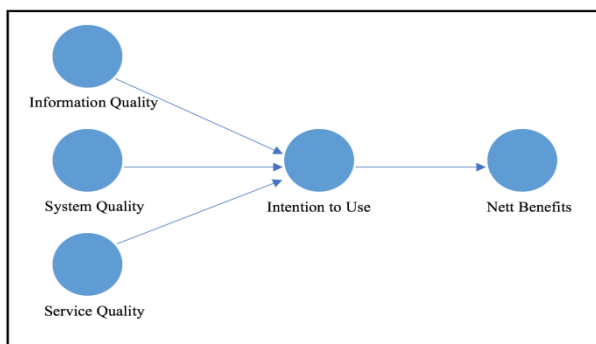

Figure 4: Conceptual Model

Information Quality (IQ) generally refers to the quality of the content of the e-services. A website or service is considered good if the content is well-organized, relevant,

customized to cater the targeted users, easy to understand and offers high security especially during purchasing or business transactions. *System Quality (SYSQ)* is to measure the usability, reliability, adaptability, availability and response time of this e-Government service. *Service Quality (SQ)* usually refers to the service providers which could be from the IS department, other departments or third party organizations to deliver the support to the users. An excellent service provider will likely to increase the users' experience, satisfaction and prevent sale losses. *Intention to Use (IU)* is an essential factor to measure users' viewpoints of this e-Government service. This measure covers the whole process of the users' experience of using the system. *Nett Benefits (NB)* are the most key success measures of an electronic system and dictate the successfulness of an IS system. It may have positive or negative impact on individual users, organizations or societies which determined by specific context and objectives for this system.

This model postulates four propositions: (i) Information Quality positively correlates with Intention to Use (ii) System Quality positively correlates with Intention to Use (iii) Service Quality positively correlates with Intention to Use (iv) Intention to Use positively correlates with Nett Benefits.

VI. CONCLUSION

This paper investigates the information sharing requirements among the government agencies in implementing the e-Government services and e-Procurement in Malaysia and Indonesia. Through the lens of D&M IS Success Model, a conceptual model is proposed. This study significantly undertakings in proposing the design model of information sharing in E-Government services among government agencies in Malaysia. It is valuable toward field of information sharing model by providing the model criteria and scheme algorithm design in developing in term of model in E-Procurement in several agencies. Moreover, this study also proposed model of information sharing that compatible with E-government agencies. This model is helpful as the guidance for implementation of several research areas about information sharing. Further empirical investigation is required to determine the model ability.

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