

A Literature Review of Infrastructure Capabilities in Shared E-Government Concept

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Abstract— The rapid development of e-government around the world has discussed and studied by many researches to improve the service performance of local government. This paper presents a literature study for the development of a shared electronic government (e-government) through IT infrastructure capability adoption. The shared e-government is developed based on the previous studies of IT infrastructure capability including Duncan [1], Byrd and Turner [2] and Broadbent and Weill [3]. This research reveals that there are five capabilities of shared e-government concept utilized as guidelines for local governments to develop a shared e-government to reduce the budget of e-government development. It is recommended for the Indonesian and local governments to develop comprehensive capabilities and progress assessments which include connectivity, Modularity, serviceability, political willingness and skilled IT human resources to support the development of shared e-government.

Keywords— *E-Government; Development; IT infrastructure; IT capability; Indonesia*

I. INTRODUCTION

E-government implementation is an effort to develop electronic-based governance to improve the quality of public services more effectively and efficiently [1]. This is supported by the Decree of the Minister of Administrative and Bureaucratic Reform Number 13 / KEP / M.PAN / 1/2003 and Presidential Regulation (Perpres) Number 95 of 2018 concerning Electronic Based Government Systems (SPBE), concerning General Guidelines for Electronic Office Intranet Environments in Institutional Environments The government, which is also an important foundation in implementing E-government in Indonesia.

This policy also requires the local government and its agencies to build and use information technology to support government performance and improve public services. Antoni, et al. [4] revealed With the aim of ease of communication the concept of E-government is one example of the implementation of e -business practices in the field of governance, thus that the implementation of E-government within the local government is expected to be a vehicle to accelerate information exchange transactions with community members (G2C), to business community (G2B), and of course with the government itself (G2G). In this case, the concept of transformation is the main factors that should be applied, not just the use of the technology, but the use of technology that can support the system of policymaking and public service in a better direction [5].

Although there are many policies and regulation that encourage the local government to implement the e-government systems, the budget for implementing e-Government are still limited and quite expensive. For example, the Jakarta provincial government spends more than 30 billion rupiah per year for implementing and upgrading e-Government and Bandung and Surabaya spend \pm 25 billion per year to create a friendly public service for their citizen. Therefore, there is a need to develop a concept of e-government utilized for sharing services and expertise among local governments who have limited and unlimited budgets to create a larger number of government services for the citizen.

There is much research at developing the concept of shared e -government from different perspectives. For example, Janssen and Wagenaar [6] state that shared e-government can be developed from motives and management perspective to provide the flexibility services of e-government. Chun, et al. [7] examine the role of openness and transparency to build shared e-government to support the collaborative decision-making process by including the public in the inception of new government policies. Janssen, et al. [8] develop the concept of shared e-government through IT infrastructure including services center and service networks perspectives. Thus, this study attempts to develop a concept of shared e -government IT capability to identify the abilities of shared e-government.

This study, therefore, focuses on identifying the capability of shared e-government based on prior literature of IT infrastructure capability as an initiative was formed to create shared s-Government.

This paper is organized as follows. Firstly, the research methodology used to identify the IT infrastructure capability of e-government based on prior literature. Secondly, this study provides e -government development in Indonesia and followed by the development of the concept of shared e-government. Finally, the implication and conclusion will be discussed.

II. RESEARCH METHODOLOGY

A literature review method is one of the approaches to review emerging trends by conducting a systematic review. Levy and Ellis [9] posit that a systematic review involves three sequential activities of input, process, and output. There is a need to collect comprehensive literature of relevant papers as many as possible. As the research aims to develop a deeper and clearer conceptualization of shared e-government, a review of the IT infrastructure capability related to e-government and academic and practitioner

literature as well as literature on the technical, social and process views of IS has been undertaken. A literature review method is suitable for creating a foundation for advancing knowledge and theory development [10]. Thus, the first relevant articles were identified from Google Scholar, Science Direct, Emerald, EBSCO and ProQuest databases using the search terms “shared e-government”, “IT Infrastructure”, “IT Capability” and “e-government”.

III. E-GOVERNMENT DEVELOPMENT IN INDONESIA

Electronic government is commonly known as e-government. It is an effort of the local and central government to develop the electronic-based government [11, 12]. This is defined as a structuring management system and work processes in the government by maximizing the utilization of information and communication technology [4].

Indonesia is one of the biggest developing countries with over 257 million citizens. Internet penetration has reached 22% of the total population [11]. The Indonesian Government, therefore, believes that e-government is the most suitable platform to serve the large numbers of online citizens [27]. The Government of Indonesia has been utilized IT infrastructure and systems for the public administration services for almost 50 years. In addition, the State Administration Automation Coordinating Agency in Indonesia is developed to supervisor the distribution of computer systems across government institutions in 1969 [13], consequently, many computer programs and applications in public administration services have been utilized. These programs, however, are only designed to perform fundamental tasks such as typing and computing without any specific functions related to the delivery of government services.

In the last 10 years, the Indonesia Government officially introduced the e-Indonesia initiative for facilitating the development of e-government. In the current development program, the Indonesian Government has committed to spending US\$6.78 billion for e-government development from 2014 to 2019 [11]. The Indonesian Government sets six active milestones for the electronic Indonesia initiative as shown in Fig. 1.

The principal purposes of these six-year plan include enhancing the providing of public services, (b) closing the digital divide, (c) emphasising corruptions through the transparency of e-government, (d) improving the quality of education sector, (e) supporting the country's growth, ultimately (f) enriching the quality of life of Indonesian citizens. To achieve the objectives of the e-Indonesia initiative, five redevelopment programs including (a) open government program, (b) human resource development program, (c) ICT infrastructure investment program, (d) public participation improvement program, and (e) policies and institutional development programs.



Fig. 1. The Roadmap of E-government of Indonesia [12]

IV. CONCEPT OF SHARED E-GOVERNMENT DEVELOPMENT

In this section, this paper presents a shared e-government conceptual framework developed by Duncan [1], Byrd and Turner [2], Broadbent and Weill [3] and Antoni and Jie [14]. It is used for identifying the role of IT infrastructure capability to build a concept of shared e-government.

IT infrastructure is described as the foundation of shared IT capabilities that enable the development of IT applications and the support of business processes in private and public organizations including government [15, 16]. It consists of platform technologies, networks telecommunication technologies, key data, and core software applications [17]. IT infrastructures have several basic characteristics including centralized management and efficient operations. Hence, IT Infrastructure has a significant capability to assist organizations to face dynamic change, reengineering their business processes and to reach business units or extensive international or geographically dispersed operations [15]. This is because IT infrastructure has connectivity, Functionality, modularity, flexibility, serviceability, compatibility, and accessibility to help the organization in business processes and achieve business goals.

The development of the concept of shared e-governments is based on the definition of sharing capability in IT infrastructure. Sharing capability represents the efficiency of the IT infrastructure resources interlinkage in providing homogenous services to the customers within and outside the organization including public organizations such as government. The sharing capabilities require both the internal technical (e.g. software, cabling, and equipment) and managerial expertise required to provide effective service [15]. Sharing capability refers to “reach and range” [18]. “Reach” refers to the locations that would be linked through the IT infrastructure from local information systems in organizations to customers and suppliers domestically, to international locations or anyone, anywhere. “Range” determines the level of functionality including the business process that would be shared automatically and seamlessly across every single level of reach. These capabilities indicate a large of level sharing competency and connectivity ability for “anything to anyone at any time” [18]. Therefore, through these capabilities, the shared e-government ability might be

developed to reach the citizen beyond the boundary of the city or nation.

This study will utilize the reach and range to identify the sharing capabilities of IT infrastructure including connectivity, modularity, and serviceability

A. Connectivity

The connectivity is defined as the extent to which the government use its IT infrastructure to connect all resources to improve service quality to citizen [1, 3]. The connectivity with adequate reach and range enable the local government to capture information about citizen and spread information to stakeholders through the Internet, virtual communities, and personalized information channels [3, 19]. In addition, connectivity refers to the ability to link data and information to each other among government offices [20]. Successfully using and reusing e-government in different city and regency depend on the compatibility and connectivity of IT infrastructure elements. Therefore, the connectivity capability is central to information-based innovation, reengineering, and also for managing the rapid change of technological generations [1].

B. Modularity

E-government is an information system that has elements connected to achieve a goal. Those elements are built based on the modules in order to manage it easier or more manageable [21]. To develop the sharing capability of e-government, the system has to have a sophisticated form of modularity which expands the concepts of shareability and reusability to both applications and data [1]. The concept of modularity for shared e-government implementation has to standardize governance and systems processes as many as possible [22]. It is Encapsulated in separate modules, business rules, implementation code, and individual processes that may become far more accessible. Applying the modularity technique to adopt shared e-government from other local governments has to consider their IT infrastructure including hardware of network, database, and business process [23]. Additionally, every government's IS technology, its unique perspectives on data ownership and usage across government agencies, and its approach to IT infrastructure all affect the shareability data in the adopted e-government [21]. Therefore, the shared e-government implementation requires modularity capability to adapt rapidly changing environment through standardizing data and business rules.

C. Serviceability

Shared e-government provides several services as a capability for local government to serve the citizen. Serviceability is defined as the ability to deliver kind of services to meet the public demands which focus on the efficiency of procedures and governances. This serviceability of shared e-government based on Sabani, et al. [11], [24] and [25] which consists of four stages including emerging stage, enhancement stage, transaction stage and connection stage. The first stage is the initial stage where the government provides static information online. This stage emphasizes on providing information such as government contact information and policy announcements. The quality of information is the primary concern in this stage. The development of technologies raises the expectation of citizens for e-government to deliver services beyond information delivery. The second serviceability in the enhancement stage is about facilitating simple communication between the government and the public. It

is an intermediate phase where the government provides dynamic information and basic one-way transactions. One of the most common examples is the online feedback, where citizens can submit their complaints of the physical government services to the official website. In addition to the information quality, the timeliness of information becomes one of the main concerns in this stage. Transaction ability is about improving the delivery of public services through the use of e-government. It is an intermediate stage where two-way transactions are enabled. For instance, online taxation portal implementation as an e-government services in Indonesia, in which citizens are able to file their tax online in this stage, whereas previously this could only be done by citizen through visiting the nearest taxation office in their city. Mostly, numerous developing countries including Indonesia are at the beginning of this stage. Connection-based capability of e-government focuses on redefining the delivery of public services by providing the one-stop integrated e-government system in which citizens can immediately access whole kinds of public services. This is the capability of e-government development which assumes that horizontal connections between government institutions as well as vertical connections among central and local governments are in place in which a reliable infrastructure with the full capacity to support is also established.

D. Political will

Developing e-government in developing countries including Indonesia is still undergoing and depending on political transformation [26]. Other factors are rigid political structures, inefficiency in governance, and corruption, which have been cited as some of the significant barriers preventing e-government [27]. Furthermore, political instability and bad governance in the local governance of Indonesia have slowed e-government improvement [28]. For instance, when the local government requires a new system in e-government including shared e-government, the government has to seek several permission and budget approval from the head of government unit office, Mayor of city or Regent of regency, and Parliament [28]. In other word, the development of e-government has a rigid political structure with many procedures and inefficiency in governance [5]. Therefore, in order to implement the shared e-government, this research suggests a political will as the capability for the local government of Indonesia.

E. Skilled IT Human Resources

The issue of e-government implementation is rare for skilled IT human resources in local governments [28]. With skilled IT human resources, the local governments in Indonesia are able to be independent to develop public service systems in their e-government. This because the skilled IT staff can help the government to interpret the government service issues into the information systems and develop the appropriate technical solutions including internet network, database, etc [29]. The government of Indonesia occasionally provides information systems including e-government to local government. In this case, the local government has to have adequate skilled IT human resources to adopt those systems that can be implemented in their environment [2]. Thus, the IT human resources should be having the ability the plan, organize, and lead the e-government projects and be sensitive to government culture and politics. In conclusion, skilled IT human resources have a significant role in implementing shared e-government.

TABLE I. THE OVERVIEW OF SHARED E-GOVERNMENT DEVELOPMENT

No	Dimensions	Indicators	Ref.
1	Connectivity	Reach the government office to be connected Range the level of functionality covered Re-using the e-government Sharing Resources across platforms	[1],[3], [19], [20]
2	Modularity	Independent components infrastructure Manageable systems of IT Reusable systems Standardizing data and report	[1], [21], [22], [23]
3	Serviceability	Informative ability Transaerm ability Communicative ability Connection ability	[11],[24], [25], [1], [2],
4	Political Will	Effortless of administration Simple rules Easily procedures	[26],[27], [28], [5], [30]
5	Skilled IT Human Resources	Interpretation adaptation planning organizing leading	[2],[28], [29]

V. CONCLUSION

Shared E-Government development with the conceptual IT infrastructure approach is very interesting to study. This study highlights several findings on the role of IT infrastructure capability, which a comprehensive review of prior literature and reports. This research reveals the several capabilities of shared e-government concepts including connectivity, modularity, serviceability, political will, and skilled IT human resources. Those capabilities are required when the local governments in Indonesia desire to adopt shared e-government to provide a new service to their citizens.

This developed concept might be used to help the local governments in developing e-government systems with a limited budget. It can be concluded that the shared concept of E-Government is better for minimizing E-Government costs in future work.

This study contributes to the e-government research domain from both the theoretical and practical perspectives. In term of theoretical perspective, this study provides a better understanding of the shared e-government concept developed from IT infrastructure capability viewpoint. From a practical perspective, this research presents the Indonesian and local government with relevant references and recommendations on how to adopt shared e-government to improve their service performance. Thus, this research suggests the framework or concept for continuous e-government development in Indonesia.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the research publication funding from LPPM Universitas Bina Darma and also provided insight and expertise that greatly assisted the research.

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