

# The Role of IT Infrastructure Capability in Shared E- Government Concept

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# The Role of IT Infrastructure Capability 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 in order to improve the service performance of local government. This paper presents a literature study for the development of 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 in order to reduce the budget of e-government development. It is recommended for the Indonesian and local government 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; Indonesia

## I. INTRODUCTION

E-government implementation is an effort to develop electronic-based governance in order 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 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 policy making 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, Jakarta provincial government spends more than 30 billion rupiah per year for implementing and upgrading of e-Government and Bandung and Surabaya spend ± 25 billion per year to create a friendly public service for their citizen.

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

## II. LITERATURE REVIEW METHOD

A literature review method is one of the approach to review emerging trend through conducting a systematic review. Levy and Ellis [6] 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. By doing so, the outcome of such review is often claimed to be representative of the state of art of a research domain. Therefore, this research followed a literature review approach as the main method.

## III. E-GOVERNMENT DEVELOPMENT IN INDONESIA

Electronic government is commonly known as e-government. It is an effort of local and central government to develop electronic-based government [7, 8]. This is defined as a structuring management system and work processes in the government through 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 [7]. 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 utilised IT infrastructure and systems for the public administration services 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 [9]. consequently, many computer programs and applications in the public administration services have been utilised. These programs, however, are only designed to perform fundamental tasks such as typing and computing without any specific functions related to the delivery of e-government services.

In the last 10 years, the Indonesia Government officially introduced the e-Indonesia initiative for facilitating the development of 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 [7]. The Indonesian Government sets six active milestones for eelectronic Indonesia initiative as showed in Figure 1.

The principal purposes of these six-year plan include (a) 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 edevelopment 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 [8]

#### 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 [10]. It is used for identifying the 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 organisations including government [11, 12]. It consists of platform technologies, networks telecommunication technologies, key data, and core software applications [13]. IT infrastructures have several basic characteristics including centralised management and efficient operations. Hence, IT Infrastructure has a significant capability to assist organisations to face dynamic change, reengineering their business processes and to reach business units or extensive international or geographically dispersed operations [11]. This is because IT infrastructure has connectivity, Functionality, modularity, flexibility, serviceability, compatibility, and accessibility to help the organisation in business processes and achieve business goals.

Development of 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 organisation including public organization such as government. The sharing capabilities require the both the

internal technical (e.g. software, cabling, and equipment) and managerial expertise required to provides effective service [11]. Sharing capability refers to "reach and range"[14]. "Reach" refers to the locations that would be linked through the IT infrastructure from local information systems in organisations to customers and suppliers domestically, to international locations or to anyone, anywhere. "Range" determines the level of functionality including 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 anytime" [14]. 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 utilise the reach and range to identify the sharing capabilities of IT infrastructure including connectivity, modularity, and serviceability

##### A. Connectivity <sup>16</sup>

The connectivity is defined as the extent to which government use its IT infrastructure to connect all resources together in order 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, 15]. In addition, the connectivity refers to the ability to link data and information each other among government offices [16]. 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 which has elements connected each other in order to achieve a goal. Those elements are built based on the modules in order to manage it easily or more manageable [17]. To develop sharing capability of e-government, the system has to have sophisticated form of modularify which expands the concepts of sharability 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 [18]. It is Encapsulated in separate modules, business rules, implementation code, and individual processes may become far more accessible. Applying modularity technique to adopt shared e-government from other local government has to consider their IT infrastructure including hardware of network, database, and business process [19]. Additionally, every government's IS technology, its unique perspectives on data ownership and usage across government agency, and its approach to IT infrastructure all affect the shareability data in the adopted e-government [17]. 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 capability for local government to serve the citizen. Serviceability is defined as ability to deliver kind of services to meet the public demands which focuses on the efficiency of procedures and governances. This serviceability of shared e-government based on Sabani, et al. [7], [20] and [21] 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 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 a 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 government are in place in which a reliable infrastructure with the full capacity to support is also established.

### D. Political will

Developing an e-government in developing countries including Indonesia are still undergoing and depending on political transformation [22]. Other factors are rigid political structures, inefficiency in governance, and corruption, which have been cited as some of the significant barriers preventing e-government [23]. Furthermore, political instability and bad governance in local governance of Indonesia have slowed e-government improvement [24]. 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 head of government unit office, Mayor of city or Regent of regency, and Parliament [24]. 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 suggest political will as capability for local government of Indonesia.

### E. Skilled IT human resources

The issue of e-government implementation is rare of skilled IT human resources in local governments [24]. 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 [25]. The government of Indonesia occasionally provide the 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, the skilled IT human resources have a significant role in implementing the shared e-government.

TABLE I. THE OVERVIEW OF SHARED E-GOVERNMENT DEVELOPMENT

No	Dimensions	Indikator	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],[15],[16]
2	Modularity	Independent components of IT infrastructure Manageable systems Reusable systems Standardizing data and report	[1],[17],[18],[19]
3	Serviceability	Informative ability Tranaem ability Communicative ability Connection ability	[7],[20],[21],[1],[1],[2]
4	Political Will	Affortless of administration Simple rules Easily procedures	[22],[23],[24],[5],[26]
5	Skilled IT Human Resouces	Interpretation adaptation planning organizing leading	[2],[24],[25]

## V. CONCLUSION

The 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 concept including connectivity, modularity, serviceability, pollical 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 citizen.

This concept is developed to address various issues including limited budget for e-government development in some cities and regencies in Indonesia. The adoption of Shared E-Government has a positive influence on the

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 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 of better strategies and policies for the continuous e-government development in Indonesia.

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