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Comparison of popular e-government implementation models

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Abstract

E-government implementation has become a priority in many countries around the world. This phenomenon has further grown in the developing countries as it could improve the quality of services, increase the economic competitiveness and enhance transparency between the government and the public. Therefore, many governments are widely supporting the electronic public services in order to enable their citizens and the businesses to make most of full transactions within the government via electronic channels. There are different types of e-government implementation models that have been proposed to guide the development process. However, most of these models have various conflicting stages and focus on different critical factors. The lack of consensus on how many stages that should be included in e-government model requires a thorough investigation. This paper reviews five different e-government models and presents four main comprehensive stages that are important to develop successful infrastructures and applications for electronic government.

Keywords: e-Government ; e-Government Implementation Model; Developing Countries

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1. Introduction

Computers have been widely used in developed and developing countries since the end of the last century, which have eventually led to a revolution in information and communication technology (ICT) known as (digital revolution). There is no doubt that the digital revolution that has its roots in the developed world is spreading rapidly to the developing world [1]. Nowadays, e-Government is one of the most important applications of ICT, that have become a priority in all countries of the world, and this priority is growing rapidly in developing countries. Many governments are supporting the electronic delivery of public services to the citizens and the

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businesses, which would allow them to make the most of transactions and interactions through the electronic channels.

The use of information technology to support governmental processes is called electronic government. World Bank website [2] has defined e-government as: "*government use of information communication technologies to offer for citizens and businesses the opportunity to interact and conduct business with government by using different electronic media such as telephone touch pad, fax, smart cards, self-service kiosks, e-mail / Internet, and EDI. It is about how government organizes itself: its administration, rules, regulations and frameworks set out to carry out service delivery and to co-ordinate, communicate and integrate processes within it*".

The main objective of e-Government is to improve communication and delivery services from government to citizen and other entities and vice versa [3]. Most e-Government researchers classify e-Government initiatives into four major categories [4]: (1) Government-to-Citizen (G2C) designed to facilitate citizen interaction with government to communicate information to each other online [5]; (2) Government-to-Business (G2B) initiative focuses on the use of ICT strategies to facilitate government interactions in the business sector to procure the goods and services [5]; (3) Government-to-Government (G2G) that is considered as the backbone for e-Government, used to improve the delivery of information in an efficient manner and interaction among government officials within the government departments themselves [3, 5]; and (4) Government-to-Employees (G2E), in which will allow the coordination of internal operations and improve the internal efficiency of business processes [4].

The reminder of this paper is organized as follows. Section 2 describes the most popular e-government implementation models used in developing countries. Section 3 presented the overview to four comprehensive stages that are important to develop successful infrastructures and applications of e-Government in developing countries, while Section 4 provides concluding remarks for this paper.

2. Overview of e-Government Implementation Models

Governments around the world have different strategies and plans to build structure of e-Government. Some have comprehensive long-term plans; others have chosen to distinguish only a few key areas as focal points of early projects. In any case, some countries that are characterized as more successful in the implementation of e-Government projects, which are initiated through smaller projects in phases on which to build a structure [6, 7]. The implementation of e-Government is composed of several stages, and a few e-Government stage models have been proposed. The objective of these models are to show the successful way for governments to implement e-Government, and how to develop and implement the infrastructure and the successful application of e-Government [8]. This paper reviews the stages of e-government implementation; there are different stages of e-government provision from the evolutionary point of view, where information systems to grow and develop with the confidence acceptance and resources is one advocated, with governments going through a number of stages before reaching maturity. There remains a lack of consensus regarding how many stages of maturity an e-government system goes through. In these models some researchers believe that only three stages are necessary, others believe that four, five or even six stages are required [9]. From these studies, it is clear that e-government involves multiple stages or phases for implementation and is not a one-step process.

Many developing countries have implemented e-government models based on the theories and experiences of developed countries [10]. However, most these e-government implementation models may not be applicable in developing countries, as the current e-government models are specifically designed to the context of developed countries. Thus, it is inappropriate to adopt these models in developing countries without modifying the original design. Some of e-government models were either proposed and developed by individual researchers (e.g. Hiller and Blanger's five stage model; Layne and Lee's four stage model) or by institutions (e.g. United Nation's five stage model; Gartner's four stage model; Asia Pacific's six stage model) [11].

Layne and Lee's four stage model [12] – This model have four stages: Catalogue: providing means to deliver

static or basic information through web sites online and downloadable forms. Transaction: conducting simple on-line transactions (two-way communication). Vertical Integration: involves integrating government functions at different levels such as those of local and states governments. Horizontal Integration: integrating varying functions and systems between different levels so as to provide users with a unified and seamless service. This model views e-government as a developmental phenomenon and is based on the observation of the authors' experience in this field. This model is based on technical, organizational and managerial feasibility to help the administrators think about e-government and their organizations [6, 11]. The model focus on the identification of integrated services to citizens and allows the service provider to build services according to the needs of citizens. The model also does not consider the possibility to benefit from political changes, and also has very low consideration on non-technical issues, such as cultural, economical, ethical, legal and regulatory [13].

United Nation's five stage model [10] - This model is very similar to the Layne and Lee model. UN Model consists of five stages. (1) Emerging web presence: creating government website that mainly provides limited and static information. (2) Enhanced web presence: government websites are improved and are more dynamic, and are regularly updated with current information. (3) Interactive web presence: the interaction takes place at a more sophisticated level. (4) Transactional web presence: two-way interactions between the citizen and government, the financial transactions are available online. (5) Seamless web presence: has sophisticated level of e-government services delivery and departmental boundaries are integrated. The UN model is based on development in the technology tools such as (web-based) and administrative aspects (functionality). This model also consider specific issues related to technical security at the transactional stage. However, this model does not consider the possibility to benefit from political changes [10, 11].

Gartner's four stage model [14] - This model highlight the evolutionary nature of e-government that focuses on citizen-centric and partial functionality, based on technology, organizational and managerial feasibility [12]. Gartner's model consists of four stages. (1) Web presence: provide basic and simple information through static website that the citizen can access. (2) Interaction: allows simple interactions between the government and other entities that provide services such as search engines. (3) Transaction: building self service applications for the public to access online services and conduct complete on-line transaction. (4) Transformation: aimed to transform current operations to ensure a more efficient, integrated, unified and personalized service. Gartner's model only emphasize partially to some issues of technical security during the transaction stage. The model also ignores the potential benefits of political changes, as the possible changes in the way of public political decision-making are left out [13].

Hiller and Blanger's five stage model [14] - This model is similar to the Layne and Lee model, and have five stages. (1) Information dissemination: government disseminates information and data on the static website. (2) Two-way communication: citizen communication online with the government at enhanced website, and interaction with citizens are done by email. (3) Service and financial transaction: the transactions are conducted online by more sophisticated technology. (4) Vertical and horizontal integration: citizen can access all government services via a single portal, vertically (intergovernmental integration) and horizontally (intra-governmental integration). (5) Political participation: citizens can involve in the political participation and some related services through internet. Hiller and Belanger stages the model to be tested empirically [13]. It based on a general and integrated perspective, and this model also focuses on the functionality and considers the potential benefits of political change [15]. In the financial transaction stage, this model only emphasizes on the security issues but ignores other specific issues that are related to non-technical [11].

Asia Pacific's six stage model [11] – The Asia Pacific model is more widespread in Asia countries, and has six stage. (1) Setting up an email system and internal network, where government systems in this stage focus on internal processes. This system typically supports basic administrative functions such as e-mails. (2) Enabling inter-organizational and public access to information: involves developing government systems that will help in managing workflow through government processes by removing paper and managing it electronically. (3) Enabling two-way communication: this allows 2-way communication between the government and the public by using ICT tools. Users send the messages to the government and receive response. (4) Allowing exchange of

value: allows flexible and convenient ways for citizens to conduct business with the government. (5) Digital democracy: gives citizens the opportunity to benefit from ICT-enabled voting sites, which can potentially support participatory and democratic processes. (6) Joined-up government: allows both vertical and horizontal integration of service delivery to help citizens get seamless service without needing to know which government agencies are responsible. This model does not address specific issues explicitly, with the exception of stage four (allowing of exchange of value) [5, 6]. It also considers for the potential benefit of political changes. However, this model is citizen-centric and therefore, only focuses on the functionality [11].

3. Discussion

Based on the discussion on popular e-government implementation model, four main comprehensive stages that are important to develop successful infrastructures and applications for electronic government are derived and proposed in this paper, which are : Emerging and Information Dissemination, Two Way Communication, Integration and E-democracy. Table 1 shows the stages of the comparison of the e-government implementation model using the comprehensive e-government model four stages. Each stages have two levels, which represent the basic level (on the left) and the advance level (on the right) of the stage.

Table 1 . E-Government Implementation Model Comparison and the Four Main Comprehensive Stages

Models	Setup		Initial		Intermediate		Advance	
	Emerging and Information Dissemination		Two-way Communication		Integration		E-democracy	
Layne and Lee's Model	Cataloguing		Transaction		Vertical integration	Full integration		
UN's Model	Emerging web presence	Enhanced web presence	Interactive web presence	Transactional web presence	Seamless/ Networked web presence		Integration	
Gartner's Model	Information		Interaction		Transaction			
Hiller and Belanger's Model	Information dissemination		Two-way communication		financial transaction	Vertical and horizontal integration		Participatio n
Asia Pacific's Model	Setting up an email system and internal network	Enabling inter-organizational and public access to information	Allowing two-way communication	Allowing exchange of value			Digital democracy	Joined-up government

(1) Emerging and information dissemination (Setup): The emerging and information stage is the most basic form of e-government. In this stage, the governments provides basic means of communication and establish government websites to communicate public policies, laws and regulation, reports, newsletters, and downloadable forms as well as basic information to citizen. Additionally, training courses are provided for rural and urban citizens for using e-government services through internet and email. The interaction indicator is mostly un-directional with information flowing, and is a one way communication from the government to the users. The main difference between this stage and other higher stages is that in this stage the governments only provide information on the web sites and interaction is not possible. This stage is based on the UN model and Asia Pacific model. (2) Two-way communication (Initial): The interaction takes place at a more sophisticated level as this stage allows two-way interactions between the citizen and government to enhance communications to the users. Government officials can be contacted via email as well as through telephone and mobile. Users (including customers and businesses) can request benefit statements and receive the responses by mail, telephone or mobile. Users can also conduct complete simple on-line transaction. Audio and video capabilities are used for communicating relevant public information and basic search facilities are provided on the website.

This stage is based on the Hiller & Belanger's model. (3) Full Integration (Intermediate): In this stage, the government attempts to integrate various government services vertically and horizontally, vertical (i.e. governments in different levels) and horizontal integration (i.e. different departments or governments in different locations), for enhancing efficient and personalized services to every citizen according to their own needs and preferences. The interaction include submitting requests or applications online 24\7 to conduct complete and secure transactions, this include options for paying taxes or fees; applying for passport, license renewals, and obtaining birth certificates by allowing users to submit the applications online. The governments build a single and unified portal for providing integrated and seamless services instead of separate distributed services. This stage is based on Layne & Lee model. (4) E-democracy (Advanced): This is the final stage, where the government encourages citizens to participate in decision-making and political participation activities such as online voting, online public forums, polling and surveys and online opinion surveys for more direct and wider interaction with the public through interactive features. Here, the e-government gradually changes the way in which people make political decisions. This stage is based on the Hiller & Belanger's model and Asia Pacific's model.

4. Conclusion

This paper has reviewed several previous models on e-government and each of these models has its' own characteristics and addresses various technical and non- technical issues. In addition, some researchers believes that only three stages are necessary in the e-government model development, while others consider that four, five or even six stages are required. Based on the prior models, the newly comprehensive model proposed in this paper will provide better strength and is expected to comprehensively capture the overall vision of e-government. Four stages have been proposed in the development of e-government model, namely; (1) the emerging and information dissemination, (2) two way communication, (3) integration and (4) e-democracy. The proposed e-government model could offer a clearer picture for successful e-government implementation in developing countries. Furthermore, it is clearer now that the implementation of e-government involves multiple stages and is not a one-step process.

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